THE YEARBOOK OF INDUSTRY ISSUE—January 3, 1938

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STEEL

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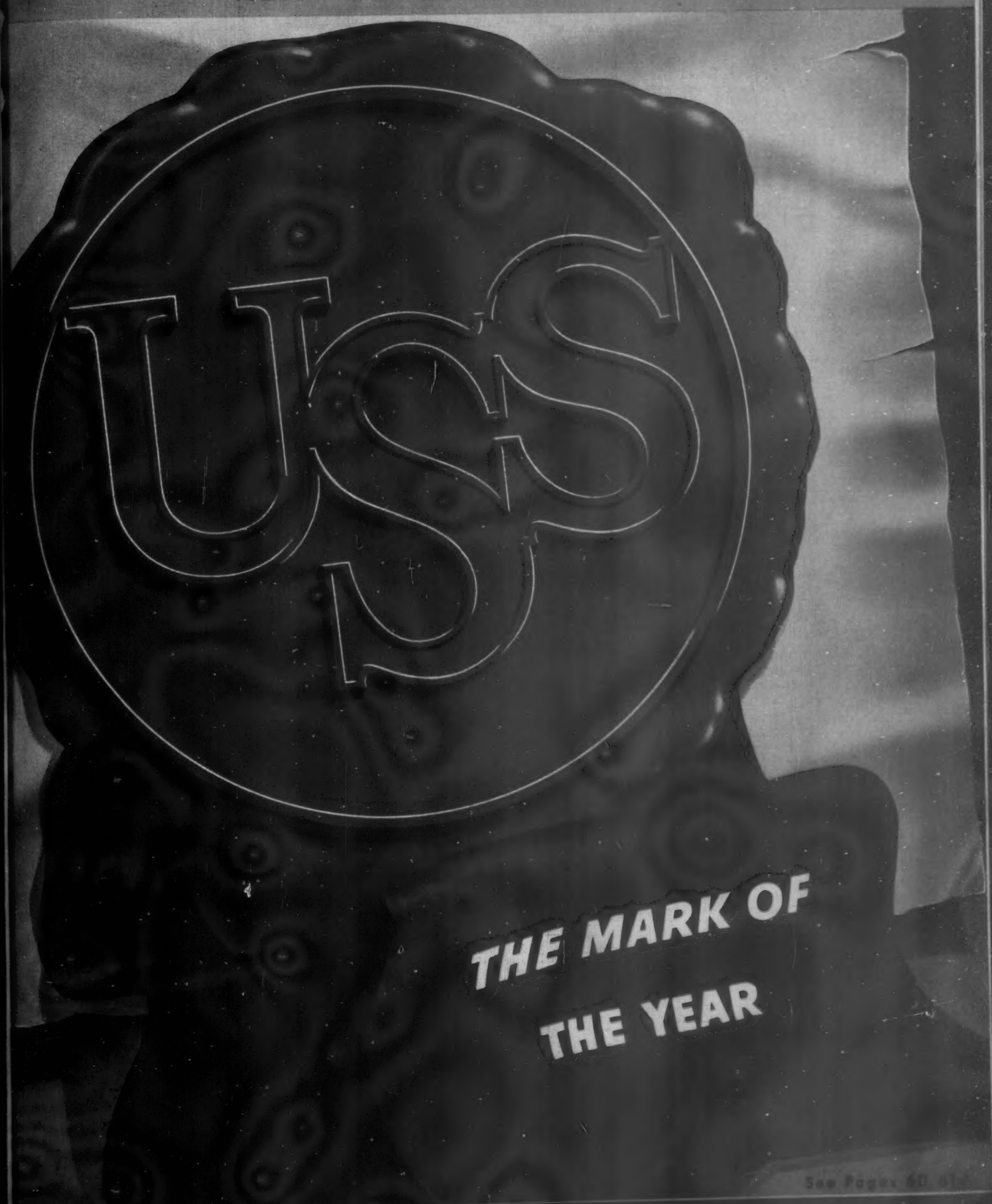
FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW



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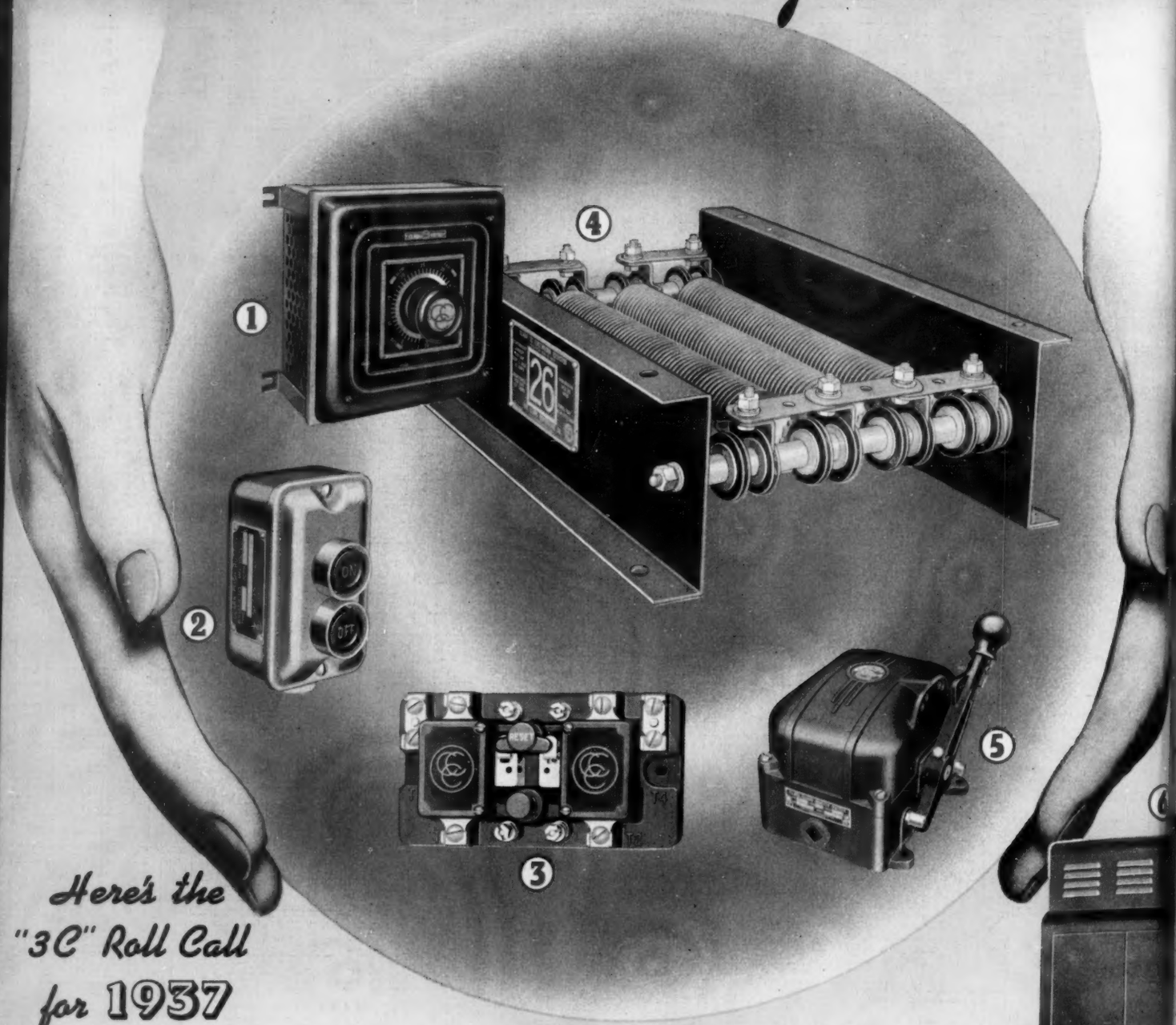
Events—and coming Events



Here's the "3C" Roll Call for 1937

1 BULLETIN 125 MILL TYPE RHEOSTAT—built like a heavyweight wrestler to stand the gaff.

2 BULLETIN 100 PUSH BUTTON. 450% larger Buttons, husky as a pioneer woodsman.

3 BULLETIN 7322 THERMAL OVERLOAD RELAY. It's Calefficient! What's that? Means hot and efficient. You said it!

4 BULLETIN 110 MILL BANK EDGEWOUND RESISTORS, light weight but heavy duty—never need "the pause that refreshes."

5 BULLETIN 101 MASTER SWITCH—the All-America guard type, oversize and speedy.

6 STREAMLINED CABINET—shapely as a show girl . . . jauntily decked with chrome and color . . . but sturdy withal.

Don't look now—but these 1937 achievements only foreshadow comprehensive 1938 developments. But definitely!

THE CLARK CONTROLLER COMPANY
1146 EAST 152nd STREET • CLEVELAND, OHIO

CONTINUE TO ROL
WITH CLARK CONTR

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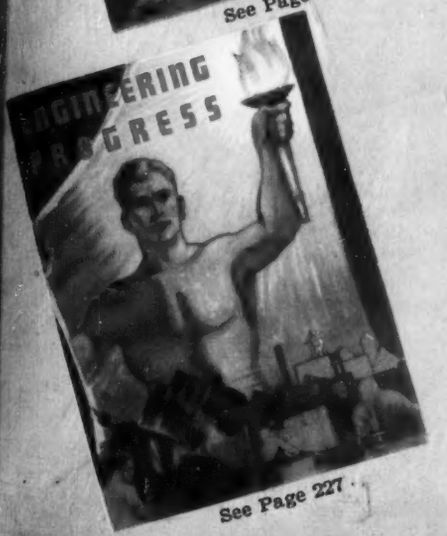

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STEEL

1938 YEARBOOK ISSUE

E. L. SHANER, *Editor-in-Chief*

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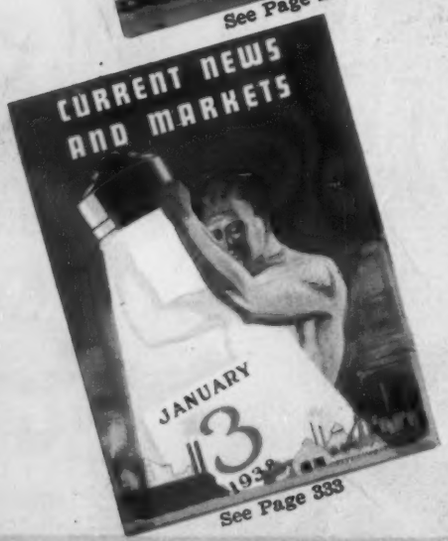

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1938 Tradename Directory

Alloy and Special Analysis Irons and Steels and Nonferrous Metals

■ AS A SECTION of its 1938 Yearbook issue, STEEL presents the accompanying comprehensive Directory of trade or brand names of alloy and special analysis irons and steels and nonferrous metals and alloys. This, the third annual directory compilation, features nonferrous metals for the first time. The two previous editions were confined to ferrous materials, including tool steels and cutting metals; corrosion, heat and wear resisting alloys; high-strength low-alloy steels, and specially processed iron and steel products. Ferrous classifications this year have been expanded to embrace welding rods and wire and ferroalloys. In addition to the new additions, both ferrous and nonferrous, the Directory has been completely revised and amplified during the year.

The Directory is in two parts. Part I consists of a compilation of tradenames under each company with the approximately 475 company names arranged alphabetically. Each company is assigned a key number, such as A2, B6, C10, etc. Part II of the Directory is an alphabetical list of the significant words or symbols in tradenames. Each item is identified by a key number referring back to the company list. In Part II, compilation of significant elements of tradenames facilitates identification. A consumer remembering any significant word or symbol of a trade or brand name, can trace its full name through liberal cross indexing presented in Part II. For instance, referring to "Cobaltcrom PRK 33," he may recall only the "PRK 33." In tracing this element, he will be directed to the source of the complete tradename. Minor grades or types, for the most part, are not cross indexed.

Approximately 85 per cent of the data presented has been verified by the producers or sellers. In the remaining minority, failure of makers or agents to reply to our inquiries has necessitated use of unverified names compiled from advertisements or current technical literature. Recognizing the possibility of error or omission, STEEL invites constructive criticism of the Directory to the end that revisions may be included in future editions.

THE EDITORS

PART I

—A—

A2 Achorn Steel Co., 351 Congress St., Boston.

Carbon Tool Steels: Fagersta (Types Best, Chisel, Cold Heading, Envelope Die, Extra Carbon, Extra Cutlery, Mining, Shoe Die, Special Carbon, Standard, Standard Cutlery).

Special Alloy Tool Steels: Dannemora DB59, Fagersta (Types Fast, Hack Saw, Hot Die, Unbreakable Chisel, White-Gold), Polhem Wire Drawing, Special Alloy Die Steel.

High Speed Tool Steel: Kloster Prior Extra.

Nondeforming Tool Steels: Fagersta (Types High Production, Superior).

A4 Acme Foundry & Machine Co., Blackwell, Okla.

Corrosion, Heat and Wear Resisting Gray Iron: Acmeloy Metal.

A6 Acme Steel Co., 2840 Archer Ave., Chicago.

Stainless Steels: Acme Stainless Steel (Types 301X, 302, 304, 410, 430).

Cold Rolled Strip Steel in Colors: Acme Colorstrip.

Cold Rolled and Stainless Strip Steel in Striped Patterns: Acme Satinstripe.

A8 Acme Steel & Malleable Iron Works, 245 Military Rd., Buffalo.

Corrosion and Wear Resisting Malleable Cast Iron: Z-Metal.

A10 Adams, W. E., Steel Co., 23 Purchase St., Boston.

Carbon Tool Steels: Balfosteel Brand, Balfour's Shoe Die, Blue Label, Dannemora Extra Best, Hacksaw, No. 000 Double Extra Carbon, U.H.B.

Special Alloy Tool Steels: Dannemora (Types Self-hardening, No. 0), Hacksaw, Hot Die, Tri-Mo Air Hardening, Tri Van, U.H.B. Super.

High Speed Tool Steels: Ultra Capital, Ultra Capital Plus One.

Nondeforming Tool Steel: Griffin Brand, U.H.B. A6, U.H.B. Special.

A12 Advance Foundry Co., 100 Parnell

Ave., Dayton, O.

Special Alloy Die Steel: Strennis Metal.

A14 Air Reduction Sales Co., 60 E. 42nd St., New York.

Ferrous Welding Rods: Airco.

Nonferrous Welding Rods: Airco.

A16 Ajax Metal Co., 46 Richmond St., Philadelphia.

Babbitt Metals for Bearings: Ajax Bull, Mitifine, Plumbite, Tinite.

Copper Alloys: Ajax, Tombasil.

A18 Ajax Tool Steel Sales Inc., 114 Liberty St., New York.

Carbon Tool Steels: 4 Best, 5 Best, EZH Extra Best, EZH Special, F.S. Extra Best, SR 4 Regular.

Special Alloy Tool Steels: 212, CR, CR 2, Cv, 2002 E S, HPS, O Diamond, SP, 2002 Special, SPS, SST, Tenax N, Tenax NB.

High Speed Tool Steels: Poldi MK; Poldimaximum, Poldimaximum Special, Poldimaximum Special 55.

Nondeforming Tool Steel: Poldi Stabil.

Corrosion and Heat Resisting Alloys: Poldi (Types AK 1, AK 2, AK 5 and AK H).

A19 Alan Wood Steel Co., Conshohocken, Pa.

High Strength Low Alloy Steel: "A. W."

A20 Albertson & Co., Sioux City, Iowa.

Heat Resisting Cast Alloys: Sioux H, Sioux Super Cast.

A22 Alemite Die Casting & Mfg. Co., Woodstock, Ill.

Die Casting Alloy: Alemite.

A24 Allan, A., & Son, Harrison, N. J.

Copper-Lead Bearing Alloys: Allan Red Metal.

A26 Allegheny Steel Co., Brackenridge, Pa.

Stainless Steels: Allegheny (Grades 17-7 [Type 301X], 22 [Type 307], 22 Special [Type 308], 33 [Type 416], 33 Non-Hardening [Type 405], 33 Turbine Quality [Type 403], "33" [Types 410, 414], 33 W [Types 418, 420, 420F], 44 [Type 309], 46 [Types 501, 502], "55" [Type 446], "66" [Types 430, 430F, 431, 434A], 66 W [Types 438, 439, 440, 441], "67" [Type 442], 2520 [Types 310, 311, 312, 315], "A" [Type 304], AMO [Type 316], A—TI [Types 321, 325, 327, 329, 330, 343], "B" [Type 305], "B" Special [Type 306], "C" [Types 302, 302 B], Ohmaloy [Type 406]). Allegheny Metal (Grades Columbium Bearing [Type 347], Free Machining [Type 303]).

A28 Allen, Edgar, Steel Co. Division, A. Milne & Co., 741 Washington St., New York.

Carbon Tool Steels: Class E, Class H Steel, f.s.d. Cast Steel, Stag, Talon.

Special Alloy Tool Steels: No. 4 Hot Work, No. 5 Hot Work, Imperial Turning and Finishing, Maxnap, Minerva Special Chisel, Red Label, Self Hardening.

High Speed Tool Steels: High Speed No. 2, Imperial Extra Special, Imperial Major, Imperial Special.

Nondeforming Tool Steels: K 9, Double Six.

A30 Allen, L. B., Co., 6759 Bryn Mawr Ave., Chicago.

Aluminum Solder: Allen Alumiflux

Stainless Steel Solders: Allen, Extra Strong, Non-Dulling.

A34 Alloy Metal Wire Co., Moores, Pa.

Stainless Irons: Types 410, 416, 430, 442, 446.

Stainless Steels: Types 302, 303, 304, 305, 306, 307, 308.

Resistance Materials: Acme, Excelsior, Premier, Superior.

A36 Alloys & Products Inc., Oakpoint Ave. & Barry St., New York.

Special Nonferrous Alloys: Alpro, Alprolite.

A38 Allyne-Ryan Foundry Co., Aetna Rd. & E. 91st St., Cleveland.

High Strength Cast Iron: Ryanite.

A40 Alumaweld Co. of America, 2442 S. Parkway, Chicago.

Aluminum and White Metal Solder: Alumaweld.

A42 Aluminum Co. of America, 634 Gulf Building, Pittsburgh.

Aluminum Alloys: Alcoa, Lynite.

Duplex Aluminum Sheets: Alclad.

Low Expansion Aluminum Alloy: Lo-Ex.

A44 Aluminum Industries Inc., 2438 Beekman St., Cincinnati.

Aluminum Alloys: Permite.

A46 Amalagamated Steel Co., 7835 Broadway, Cleveland.

Special Alloy Tool Steels: Creston, Kromal, Malax, Malcrome, Malga, Malgaloy.

A48 American Abrasive Metals Co., Irvington, N. J.

Abrasive Embedded Aluminum, Bronze, Nickel-Copper and Iron Alloys: Alumalun, Bronzalun, Nicalun, Feralun.

A50 American Boron Products Co., 2208 Elmwood Ave., Buffalo.

Nonferrous Metal Deoxidizer: Boronic Alloys.

A52 American Brass Co., Waterbury, Conn.

Copper Alloys: Ambrac, Ambraloy, Anaconda, Avialite, Benedict Nickel, Everdur, Gilding, Hitenso, Millard, Muntz Metal, Oranium Bronze, Tempaloy, Tobin Bronze.

Bronze Welding Rods: Anaconda.

A54 American Cutting Alloys Inc., 500 Fifth Ave., New York.

Cemented Carbide: Cutanit.

A56 American Dirigold Corp., Kokomo, Ind.

Aluminum Copper Alloys: Alco, Dirigold.

A58 American Hammered Piston Ring Division, Koppers Co., Bush & Hamburg Sts., Baltimore.

Alloy Cast Irons: American Hammered Piston Ring Division Standard Iron, E-8 Alloy, E-16 Alloy, E-17 Alloy, K-6 Metal, XL (Excel) Metal.

A60 American Injector Co., 1481 14th St., Detroit.

Bearing Bronzes: Agrilite.

A62 American Laundry Machinery Co., Ross & Section Aves., Cincinnati.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

A64 American Lurgi Corp., 80 Broad St., New York.

Aluminum Alloys: Silumin.

A66 American Machine & Foundry Co., 511 Fifth Ave., New York.

Lead-Tin Protective Coating: Amaloy.

A68 American Magnesium Corp., 2210 Harvard Ave., Cleveland.

Magnesium Alloys: A. M., Mazlo, X.A.M.

A70 American Manganese Steel Division, American Brake Shoe & Foundry Co., Chicago Heights, Ill.

Shock and Abrasion Resistant Cast Steel: Amsco Manganese Steel.

Corrosion Resisting Cast Steel: Amsco Alloy F-8.

Heat Resisting Cast Alloys: Amsco Alloy (Types F-1, F-3, F-5, F-6).

Corrosion and Heat Resisting Cast Alloy: Amsco Alloy F-10.

Nickel-Manganese Steel Welding Rod: Amsco.

Hard Surfacing Welding Rods: Amsco (Types No. 217, No. 459).

A72 American Nickeloid Co., Peru, Ill.

Zinc Coated with Brass, Chromium, Copper and Nickel: Brassoid, Chromaloid, Copperoid, Nickeloid.

A74 American Rolling Mill Co., Middletown, O.

Stainless Steel: Armco (Grades 13 [Type 410], 17 [Type 430], 27 [Type 446], 17-7 [Type 301X], 18-8 [Types 302 and 304], 19-9 [Types 305 and 306], 25-12 [Type 309], RA [Type 434A], 18-10Cb [Type 347], 18-125Mo [Type 316]).

Pure Iron: Armco Ingot Iron.

High Tensile Steel: Armco H. T.-50.

Galvanized Sheets: Armco (Types Paintgrip, Zincgrip).

High Silicon Steel: Tran-Cor (Types 58, 65, 72).

A76 American Smelting & Refining Co., 120 Broadway, New York.

Cadmium-Nickel Bearing Alloy: Asarcoloy.

Ferro Selenium: Asarco Brand.

A78 American Steel Co., Park Bldg., Pittsburgh.

Aluminum Alloy Wire and Strip: Alual.

A80 American Steel Foundries, 410 N. Michigan Ave., Chicago.

High Strength Cast Steel: Hylastic.

A82 American Steel & Wire Co., Rockefeller Bldg., Cleveland.

Stainless Strip Steel, Cold Finished Bars, Wire: USS Stainless.

High Strength Low Alloy Steel Strip and Wire: USS Cor-Ten, USS Man-Ten.

Steel Welding Wire: Premier.

A84 Ampco Metal Inc., 3830 W. Burnham St., Milwaukee.

Copper Alloys and Bronzes: Ampco Metal, Atlas.

Copper Alloy for Welding Electrodes: Ampco Trodaloy.

A86 Anchor Drawn Steel Co., Latrobe, Pa.

Carbon Tool Steel Drill Rods: Blue Anchor, Red Anchor.

Special Alloy Tool Steel Drill Rods: Carbon Vanadium, Non-Shrinkable, Red Star Tungsten.

High Speed Tool Steel Drill Rods: Gold Anchor.

(See additional list under Vanadium-Alloys Steel Co.—V2).

A88 Andrews Steel Co., Newport, Ky.

Special Alloy Steels: Asco.

A90 Antaciron Inc., Raritan, N. J.

High Silicon Gray Iron: Antaciron.

A92 Apex Bronze Foundry, 3037 Adeline St., Oakland, Calif.

Bronze Castings: Apex.

A94 Apex Smelting Co., 2554 W. Fillmore St., Chicago.

Aluminum Alloys and Zinc Alloys: Apex.

A96 Apollo Steel Co., Apollo, Pa.

Copper-Bearing Steel: Apolloy Metal.

A98 Arcade Malleable Iron Co. Inc., Worcester, Mass.

Corrosion and Wear Resisting Malleable Iron: Arzite Metal, Z-Metal.

A100 Arcos Corp., 401 N. Broad St., Philadelphia.

Stainless Welding Electrodes: Chromend.

A102 Ariston Metal Co., 51 E. 42nd St., New York.

Lead Base Bearing Alloy: Noheet.

A104 Armstrong Bros. Tool Co., 309 N. Francisco Ave., Chicago.

High Speed Tool Steels: Armstrong (Types High Speed, Self-Hardening).

Cemented Carbide: Armide.

A106 Arnold Engineering Co., 565 W. Washington Blvd., Chicago.

Magnet Alloy: Alnico.

A108 Athens Foundry Co., Athens, Pa.

Heat Resisting Cast Iron: Ni-Bar Iron.

A110 Atkinson Co., Rochester, N. Y.

Babbitt Bearing Metal: Plata Metal.

A112 Atlantic Steel Castings Co., Chester, Pa.

Corrosion, Heat and Wear Resisting Cast Steel: Chrome Cast.

A114 Atlantic Steel Co., 1775 Broadway, New York.

Special Alloy Tool Steels: Atlantic No. 33, Atloy, Atsco.

High Speed Tool Steels: A-C-T Carbide, Atlantic.

Nondeforming Tool Steels: Atlan Non-Shrink Die, Atlantic Die Steel, H.C.C. Die.

A116 Aurora Metal Co., Aurora, Ill.

Aluminum Bronze Alloys: Auromet, Stronger-Than-Steel.

—B—

B2 Babcock & Wilcox Co., 85 Liberty St., New York.

Corrosion and Heat Resisting Alloys: Adamantine, B&W (Types Nos. 400, 401, 402, 420, 441, 450, 600, 602, 603, 610, 640, 642, 650, 661, 690, 692, 700, 701, 800, 900, 902, 910, 912, 950, 1100, 1101, 1102, 1200, 1300, 1400, 1500, Chromium Iron, Chromium Steel, B&W Croloy (Types 1¼, 2, 2½, 3M, 5M, 9, 16-13-3, 18, 18-8, 25-20, 27), Elverite (Types A and B).

B4 Babcock & Wilcox Tube Co., Beaver Falls, Pa.

Corrosion and Heat Resisting Steel Tubes: B&W Croloy (Types 1¼, 1¾, 2, 2Si, 2¼, 2½, 3-M, 3-Si, 5, 5-M, 5-MAl, 5-MCb, 5-MSi, 5-MTi, 5-W, 9, 12, 12-3W, 15, 16-13-3, 18, 18-8, 18-8S, 18-8SCb, 18-8STi, 25-20, 27).

B6 Banner Iron Works, 4560 Shaw Blvd., St. Louis.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

B8 Bearium Metals Corp., Rochester, N. Y.

Copper-Lead Bearing Alloys: Bearium.

B10 Beckett Bronze Co., Muncie, Ind.

High Lead Bronze: Beckett Metal.

B12 Belden Mfg. Co., 4647 W. Van Buren St., Chicago.

Magnet Alloy: Alnico.

B14 Bell Telephone Laboratories Inc., 463 West St., New York.

Magnetic Alloys: Chrome Permalloy, 45 Permalloy, 78 Permalloy, Molybdenum Permalloy, Permendur, Vanadium Permendur, 7.5-70 Perminvar, 25-45 Perminvar, Remalloy.

B16 Belle City Malleable Iron Co., Racine, Wis.

Pearlitic Malleable Iron: Belmalloy.

B18 Belmont Iron Works, 22nd & Washington Ave., Philadelphia.

Floor Construction: "Belmont" Solid steel Interlocking Channel Floor.

B20 Benecke, Alex, 347 Madison Ave., New York.

Carbon Tool Steels: Best, BS, DZ, ES, EW, HS, HMS Steels, KNS, NPU, RS Spezial, SS Extra Extra, SSB, SS3V, TOS.

Special Alloy Tool Steels: BKS, BMS, Bora, BSF, BSH, BSO, BSW, BSZ, Cardinal Rapid, CNK2, CNS2h, CNW, CNWZ, CRM, CRS, CRW, CRZ, CS, CVFS, CWH, CWM, D22S, DCN, DCNA, DCNO, DCNR, DCR, DCRV, Diamant, Diamond Extra, DMOC, DMZ, DN, Durax, Durax Spezial, E, E612, E975, EMOC, FC Spezial, FCF Spezial, FCW Spezial, Goliath, Goliath Spezial, GS, GSC, GSE, Kobalt, Kobalt Spezial, KS, LS, Magnet, MC, NW, Oerstit, Pantanax, PSP, Rapid Spezial, Remanit, SA, SA/o, SA/w, SC, SK, SKL, Spezial W, SSC, SSF, SSM, Thermax, TP, Veresta, VS Spezial Extra, WC2, Wolframant, WSP, WSPS.

B24 Bethlehem Foundry & Machine Co., Bethlehem, Pa.

Silicon Cast Iron: Tantiron.

B26 Bethlehem Steel Co., Bethlehem, Pa.

Carbon Tool Steels: X, XCL, XX, XXX.

Special Alloy Tool Steels: Finishing, Lehigh Die and Tool, No. 57 (Hot Work), No. 71 Alloy, No. 445 (Hot Work), Omega, Superior, Tough.

High Speed Tool Steels: BMT, Comokut, Extra Special, H.V., Special.

Nondeforming Tool Steel: Tool Room.

Stainless Steel: Bethadur (Types Nos. 302, 410, 420, 430, 440, 442, 446), Bethalon 416 (Free Machining Corrosion-Resisting Iron Type), Bethalon 303 (Free Machining 18-8).

Alloy Steels: Amola, Mayari.

High Temperature Alloy Steels: Mayari "A", Supertemp.

Shock Resisting Steel: Bethloc.

Low Alloy High Tensile Steel: Cromansil.

Magnet Steel: Cobaflux.

Nitriding Steel: Nitralloy.

Spring Steel: Bethlehem Silico-Manganese, Enduria, Resilia.

Copper-Bearing Steel: Beth-Cu-Loy.

Wide Flange Beams, Girders and Columns: Bethlehem.

Special Zinc-Coated Wire: Bethanized Wire.

B28 Binney Castings Co., 401 Phillips St., Toledo, O.

Heat Resisting Iron Alloys and Copper Alloys: Min-Ox.

B30 Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

Alloy Cast Steel: Birdsboro (Types Nos. 26 and 30).

B32 Bissett Steel Co., 945 E. 67th St., Cleveland.

Carbon Tool Steels: Best Brand, Carbo, Very Best.

Special Alloy Tool Steels: Annite, Checkno, Cromo, Gripmore, Hypro, Woco.

High Speed Tool Steel: Tiger.

Nondeforming Tool Steel: Nonshrink.

Cemented Tungsten Carbide: Bisco.

B34 Blackor Co., 13007 S. Main St., Los Angeles.

Cemented Carbide Wear Resisting Material: Blackor.

B36 Bliss & Laughlin Inc., 281 E. 155th St., Harvey, Ill.

Cold Drawn Steels: B & L Small Rounds, Ultra-Cut Steel.

B38 Bohn Aluminum Co., 1400 Lafayette Bldg., Detroit.

Aluminum Alloys: Bohnalite.

Copper Alloys: Bohn.

B40 Boker & Co. Inc., 101 Duane St., New York.

Carbon Tool Steel: Gibraltar.

Special Alloy Tool Steels: Air Hardening, Kinite.

High Speed Tool Steel: Novo Superior.

Nondeforming Tool Steels: Intra, Water Hardening.

B42 Bonney-Floyd Co., Marion Rd., Columbus, O.

Alloy Cast Steels: Bonney-Floyd (Types HT Low Carbon, MM Steel, NCM, Zenel).

Corrosion and Heat Resisting Alloys: Bonney-Floyd (Types 4-6 CrMo, Hard Kote H, Hard Kote T, Ni-Resist, Stainless).

B44 Bound Brook Oil-Less Bearing Co., Bound Brook, N. J.

Bearing Bronze: Compo.

B46 Boyd-Wagner Co., 1440 W. Lake St., Chicago.

Carbon Tool Steels: Best Carbon, Standard Carbon, No. 4, No. 9, No. 41.

Special Alloy Tool Steels: Bowco Water Hardening Tubing, Crown W Fast Finishing, Die Cast, E. Z. 14 W Swedish Hot Die, Hypro No. 62 High-Carbon High Chrome, Impress, Special No. 18, Very Best.

High Speed Steels: Bowco, Bowco Cobalt, Rekord Extra, Rekord Superior.

Nondeforming Tool Steels: Arrow Oil Hardening, Bowco Oil Hardening Tubing, Hy-Lo Oil Hardening, Moldie.

Hot Rolled Steel Plate: B.M.S. Plate.

Swedish Iron: Bowco.

B48 Braeburn Alloy Steel Corp., Braeburn, Pa.

Carbon Tool Steels: Extra, Special, Standard.

Special Alloy Tool Steels: Alloy Finishing, Chrome Vanadium, Hot Die No. 2, Keystone, Pressurdie, Superior, T Alloy, Triton, Vibro, Viking.

High Speed Tool Steels: Bonded Carbide, Cobalt, Twinvan, Vinco.

Nondeforming Tool Steel: Kiski.

Stainless Steel: Braeburn Stainless.

B50 Braun-Steeples Co. Ltd., 636 Potrero St., San Francisco.

Aluminum Solder: Alumetal.

B52 Bridgeport Brass Co., Bridgeport, Conn.

Copper Alloys: Bridgeport, Duronze, Ledrite, Phono Bronze, Plumrite.

B54 Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.

Nickel Silver: Nickolite.

B56 Brighton Electric Steel Casting Co., Beaver Falls, Pa.

Alloy Cast Steel Piercer Points: B-XX, Bescoloy.

Corrosion and Heat Resisting Cast Steel: Bescoloy.

B58 Bronze Die Casting Co., 1836 N. Franklin St., Pittsburgh.

Aluminum Bronze: Albro.

B60 Brown-Wales Co., 493 C St., Boston.

Hot Rolled Steels: "BW" Standardized, Elastuf Media Machinery, Elastuf Penn Machinery, Unicase X1315.

Cold Finished Steels: Elastuf Penn, Cumberland Turned Ground and Polished, Precision Finished Media, Unicase X1315.

Hot Rolled Alloy Steels: Elastuf Chro-Moly Heat Treated, Elastuf Type A Alloy Machinery Heat Treated.

Stainless Steels: Carpenter No. 8 bars, Armco 18-8 and 17 sheets.

B62 Buckeye Brass & Mfg. Co., 6410 Hawthorne, Cleveland.

Bearing Bronzes: Commercial, Hy-Speed, Lubrico.

B64 Buffalo Foundry & Machine Co., 1543 Fillmore Ave., Buffalo.

Cast Iron for Chromium Plating: Buflokast.

Corrosion and Heat Resisting Cast Alloys: Buflokast.

Babbitt Metals for Bearings: Thermo-Lectric.

B66 Bundy Tubing Co., 10951 Hern St., Detroit.

Welded Steel Tubing: Bundyweld.

B68 Bunting Brass & Bronze Co., 1715 Spencer St., Toledo, O.

Bearing Babbitts and Bronzes: Bunting.

B70 Burden Iron Co., Troy, N. Y.

Hand Puddled Wrought Iron: Burden Best, Burden Wrot, Staybolt, Trojan.

B72 Burgess-Parr Co., Freeport, Ill.

Acid Resisting Alloys: Illium.

B74 Butterworth, H. W., & Sons Co., 2417 E. York St., Philadelphia.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

B76 Byers, A. M., Co., Clark Bldg., Pittsburgh.

Wrought Iron: Alloyed Genuine Wrought Iron, Genuine Wrought Iron.

–C–

C2 Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh.

Bearing Bronzes: Nicuite, Bronzstox.

Babbitt Metals: Acorn Brand, Bearite.

C4 Calorizing Co., Wilkinsburg, Pa.

Corrosion and Heat Resisting Steels: Calorized Steel (Types 4-6 ChrMoly, DM, 1.5% Moly).

Corrosion and Heat Resisting Alloys: Calite (Types A, B, B-28, B-29, BL, BL-28, E, E-28, N, N-2, NCT-3, S, S-28).

C6 Campbell, Wyant & Cannon Foundry Co., Muskegon Heights, Mich.

High Strength Cast Irons: Cannonite, Proferall.

Alloy Cast Steel: Molybdenum Silicon.

C8 Cannon-Stein Steel Corp., Syracuse, N. Y.

Carbon Tool Steels: Rita Electric, Rita Extra, Rita Special, Rita Special Drill Rod, Rita Standard, Rita Standard Drill Rod.

Special Alloy Tool Steels: Rita Car-Van Die, Rita Chrome-Vanadium, Rita Extra Special, Rita Hot Forging Die (Nos. 1 and 2), Rita T. C. V. Alloy, Chisel Steel, Rita Vanadium Drill Rod.

High Speed Tool Steels: Rita Cobalt, Rita High Speed, Rita High Speed No. 20 (18-4-2).

Nondeforming Tool Steels: Rita No-Change Oil Hardening, Rita Oil Hardening Drill Rod, Rita 3 Point-(Hi Carbon-Hi-Chrome).

Chrome-Nickel Alloy Steels: Rita, H.R. 3½% Nickel Steel.

C10 Carboloy Co. Inc., 2985 E. Jefferson Ave., Detroit.

Cemented Tantalum, Titanium and Tungsten Carbides: Carboloy.

C12 Carnegie-Illinois Steel Corp., Carnegie-Illinois Bldg., Pittsburgh.

High Strength Low Alloy Steels: USS (Types Cor-Ten, High Tensile, Man-Ten, Sil-Ten).

Special Alloy Steels: USS Carilloy.

Corrosion Resisting Steels: USS Stainless.

Abrasion Resisting Steel: USS AR Steel.

Sheet Steel Piling: USS Steel Sheet Piling.

Floor Construction: USS (Types I-Beam-Lok, T-Tri-Lok).

Black, Galvanized, Automobile and Electrical Sheets; Strip Steel; Coke, Charcoal and Terne Plate: USS.

High Tensile Low Alloy Sheets: USS (Types Cor-Ten, Cromansil, Man-Ten).

Stainless Steel Sheets: USS Stainless.

Copper Bearing Sheets: USS Copper Steel.

Galvanized Sheets: USS Galvan.

Enameling Sheets: USS Vitrenamel.

Cold Reduced Black and Tin Plate: USS Superdraw.

Structural Steel Shapes: Pencoyd.

C14 Carpenter Steel Co., Reading, Pa.

Carbon Tool Steels: Comet, Extra, H-9 Extra, Special, Titan.

Special Alloy Tool Steels: D.Y.O., Excelo, K-W, Solar.

High Speed Tool Steels: Gold Star, Star-Max, Star-Zenith.

Nondeforming Tool Steels: 610 Air Hardening, Hampden, R.D.S., Stentor.

Stainless Steels: Carpenter Stainless Steel (Nos. 1, 2, 2B, 3, 4, 5, 6, 7, 8, N-1, N-2).

Automotive Alloy Steels: Flexo and Samson (Nos. 1, 2, 4, 5, 2-317, 2-408, 2-547, 2-720, 3-314, 3-427, 3-547, 4-317, 4-408, 5-317, 5-427, 5-720, 158, 436, 500).

Miscellaneous Alloy Steels: Magnet Steel, N-30, Presto Steel.

C16 Castings Corp., 666 Andrews Bldg., Buffalo.

Corrosion and Wear Resisting Malleable Iron: Z-Metal.

Corrosion and Heat Resisting Alloys: Sterling.

C18 Central Brass & Aluminum Foundry Co., 1020 Woodrow St., Cincinnati.

Bearing Bronzes: Cenco, Hibbo.

C20 Central Foundry Co., Joplin, Mo.

High Strength Cast Iron: Aceroid.

C22 Central Iron & Steel Co., Harrisburg, Pa.

High Tensile Alloy Steel: Centralloy Steel.

C24 Cerro de Pasco Copper Corp., 44 Wall St., New York.

Bismuth-Lead-Tin-Antimony Casting Alloys: Cerrobase, Cerrobend, Cerrosafe, Cerromatrix.

C26 Chace, W. M., Co., 1616 Beard St., Detroit.

Thermostatic Metal: Chace Bi-Metal.

C28 Chain Belt Co., 1660 W. Bruce St., Milwaukee.

Corrosion and Wear Resisting Malleable Cast Iron: Rex Z-Metal.

C30 Chambersburg Engineering Co., Chambersburg, Pa.

Nickel-Molybdenum Air Furnace Iron Alloys: Cecolloy (Types A, B, C).

C32 Champion Rivet Co., 10931 Harvard Ave., Cleveland.

Ferrous Welding Rods: Black Devil, Blue Devil, Champion, Gray Devil, Red Devil.

Nonferrous Welding Rods: Tough Devil, Wear Devil.

C34 Chapman Valve Mfg. Co., Indian Orchard, Mass.

Corrosion Resisting Iron: Davis Metal.

Alloy Steel: Chrome Tungsten Steel, (patented).

C36 Chase Brass & Copper Co., Waterbury, Conn.

Copper Alloys: Admiralty, Alpha, Chamet, Chase, Corvic, Muntz Metal, Olympic.

C38 Chatillon, John, & Sons, 85 Cliff St., New York.

Spring Steel: Iso-Elastic.

C40 Chicago Hardware Foundry Co., 1037 Welders Bldg., North Chicago, Ill.

Ferous Welding Rods: Fuse-Well, Moly-Nickel.

C42 Chicago Steel Foundry Co., 3720 S. Kedzie Ave., Chicago.

Corrosion and Heat Resisting Cast Steel: Pyrasteel (Types No. 18, No. 20 and Special).

Alloy Cast Steel: Evansteel.

C44 Chrysler Corp., Amplex Division, 6501

Harper Ave., Detroit.

Oil Filled Bearing Bronze: Oilite.

C46 Cinaudagraph Corp., Stamford, Conn.

Permanent Magnet Alloys: Alnico, Nipermag.

C48 Cincinnati Milling Machine Co., Oakley, Cincinnati.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

C50 Cincinnati Steel Castings Co., 3212 Spring Grove Ave., Cincinnati.

Corrosion and Heat Resisting Cast Steel: Nevastain RA.

C52 Cleveland Brass Mfg. Co., 4606 Hamilton Ave., Cleveland.

Copper Alloys and Lead Alloys: Acimet.

C54 Cleveland Graphite Bronze Co., 880 E. 72nd St., Cleveland.

Babbitt Metal for Bearings: D-2.

Bearing Bronze: 444.

Copper-Lead Bearing Alloy: Clevite.

C56 Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland.

High Speed Tool Steel: Mo-Max.

C58 Climax Molybdenum Co., 500 Fifth Ave., New York.

Molybdenum Ferroalloys: Mo-lyb-denum.

C60 Cochrane Corp., 3107 N. 17th St., Philadelphia.

Alloy Cast Iron: Cochrome.

C62 Cold Metal Process Co., Youngstown, O.

Cold Rolled Strip Steel: Precision.

C64 Colmonoy Inc., Los Nietos, Calif.

Corrosion and Wear Resisting Material: Colmonoy, Sweaton.

C66 Colonial Steel Co., Grant Bldg., Pittsburgh.

(*See list under Vanadium-Alloys Steel Co.*—V2).

C68 Columbia Steel & Shafting Co., P. O. Box 1557, Pittsburgh.

High Tensile Alloy Steels: Columbia.

C70 Columbia Tool Steel Co., Chicago Heights, Ill.

Carbon Tool Steels: Columbia (Types Extra, Special and Standard, Electrex).

Special Alloy Tool Steels: Airex, Artdie, Buster, Die Block, Double Special, Extra Vanadium, Formite, Phoenix, Self Hardening, Standard Vanadium, Superdie, Tapdie, Waterdie.

High Speed Tool Steels: Clarite, Maxite, Molyite, Vanite.

Nondeforming Tool Steels: Exl-Die, Oildie.

Stainless Steels: Stainex (Types Nos. 1, 2, 3).

C72 Consolidated Ashcroft Hancock Co. Inc., Bridgeport, Conn.

Modified Monel Metal: M.M.M.

C74 Continental Motors Corp., 12801 E. Jefferson St., Detroit.

Magnet Alloy: Alnico.

C76 Continental Roll & Steel Foundry Co., East Chicago, Ind.

Hard Alloy for Rolls: Crasfloy, Cromonite Chill (Grades A, B, BX, C, D), Duquesne Special, Hubbard Special, Wheeling Super Steel, Wheeling Metal.

Alloy Cast Steel: Cro Mol C-10; Dynamic Steel (Types C-2, C-3, C-4); Molybdenite, C-6; Temp Alloy, C-27.

C78 Continental Steel Corp., Kokomo, Ind.

High Strength Low Alloy Steel: Konik Steel.

Corrosion Resisting Steel: Konik Metal.

Case Hardening Steel: Konik Metal.

Sheets: Galvannealed, Super Metal.

C80 Cooper Alloy Foundry Co., 150 Broadway, Elizabeth, N. J.

Corrosion and Heat Resisting Cast Alloys: Cooper Alloys (Types 16, 17, 17S, 17S Mo, 18, 19, 20, 21, 21A, 21B, 21C, 22, 23, 25-20).

C82 Cooper-Bessemer Corp., Mt. Vernon, O.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

C84 Craine-Schrage Steel Co., 8701 Epworth Blvd., Detroit.

Carbon Tool Steels: Crasco (Types Green Label, White Label).

Special Alloy Tool Steels: Crasco (Types Finishing, Special Vanadium).

High Speed Tool Steels: Crasco (Types High Speed, Tool Bits).

Nondeforming Tool Steel: Crasco (Types Black Label, Red Label).

Free Machining Die Steels: Graph-mo, Graph-sil.

C86 Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia.

Alloy Cast Irons: Cramp's Elfur Iron (Types Nos. 2, 4, 5, 6, 7, 8, 9, 11), Elfur Iron (Types Nos. 1 and 3).

Copper Alloys: Cramp Alloy, Cramp's Bronze, P.M.G. Metal.

C88 Crawford & Doherty Foundry Co., 4604 S. E. 17th St., Portland, Ore.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

C90 Crowley, John A., Co., 120 Liberty St., New York.

High Speed Tool Steel: Arrow Brand.

Cemented Carbide: Diamonite.

C92 Crucible Electric Steel Co., Homestead, Pa.

Special Alloy Tool Steels: "Cesco Diamond" Special, "Super Cesco Diamond."

C94 Crucible Steel Casting Co., W. 84th St. & Almira Ave., Cleveland.

Heat, Corrosion and Wear Resisting Cast Steels: Par (Types 1, 2, 2C, 3, 4, 5, 6, 7, 9, 9A, 10A, 11, 11A).

C96 Crucible Steel Co. of America, 405 Lexington Ave., New York.

Carbon Tool Steels: Black Diamond Tool, Extra Tool, Granada, Peerless Extra, Sanderson Special, Silver Tool, Standard Tool.

Special Alloy Tool Steels: Airdi, Alva (Types Extra, Special), Atha (Types Chrome Roll, Pneu, Rim Roll), C.C.A., Champion Extra, Crescent (Types Double Special, Hot Work No. 2), H.Y.C.C., LaBelle (Types 2-70, No. 24, No. 89, Cromonic, Silicon No. 2, Special Hot Die), Peerless A.

High Speed Tool Steels: Rex (Types No. 95, AA, AAA, Champion, Supervan, T-Mo, VM).

Nondeforming Tool Steels: Champion Non-Changeable, Paragon.

Drill Steels: Crusca (Types Broaching, Channeller Drill, Hollow Drill, Solid Drill, Twisted Augur Drill), Cruscabits, Cruscarods.

Drill Rods: Alva, Champion (Types Extra, Non-Changeable), Claremont, Crescent Special, Double Special, Dreadnought, Halcomb First Quality, Ketos, Paragon, Rex (Types AA, T-Mo, VM), Sanderson Special, Spaulding Special, VM Dreadnought, Victor.

Alloy Steels: Alva Duplex Forging, Duplex (Gear Nos. 1, 2 and 3, Case Hardening Nos. 1, 2 and 3), Simplex (Types Case Hardening, Forging), Superior Alloy Spring.

Corrosion Resisting Steels: LoCro (Types 46, 46Mo, 46-W), Rezistal (Types 2-C, FM-2, FM-188, Grade A, Grade B, Grade B100, Grade BM, KA-2, KA-2-S, KA-2-SCB, KA-2-SMO, KA-2-ST, NCT-3, No. 3, No. 4, No. 12, No. 12 Turbine Quality, No. 17, No. 20, No. 27, No. 2600).

Machinery Steel: Max-el.

Nitriding Steel: Nitralloy.

Magnet Alloy: Alnico.

Steel Welding Rods: Crusca.

C98 Cuyahoga Steel & Wire Co., Bedford, O.

Corrosion and Heat Resisting Alloy: Cuyo.

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D2 Damascus Steel Casting Co., New Brighton, Pa.

Alloy and Manganese Cast Steels: Damascus.

D4 Darwin & Milner Inc., 1260 W. Fourth St., Cleveland.

Special Alloy Tool Steels: A-B-C, Firex, Ideor, N-32, SIWI.

High Speed Tool Steels: Cannon, Darwin 505, 1366.

Nondeforming Tool Steels: Cobaltcrom-PRK 33, H Die Steel, Neor.

Tool Steel Castings: H Die Steel, Cobaltcrom.

Air Hardening Tool Steels: Darwin No. 1, PRK 33.

Manganese Iron for Hobbing and Molds: Hobalite.

Corrosion and Heat Resisting Alloys: Cobaltchrome (Stainless), Pireks C-C, Pireks R-C-C, Pireks-Reactal.

D6 Dayton Malleable Iron Co., 1307 W. Third St., Dayton, O.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

D8 Delaware Tool Steel Corp., East Wilmington, Del.

Carbon Tool Steels: Delaware (Types Extra, Standard).

Special Alloy Tool Steels: C-4, Cartun, Delsteel Alloy, Drillalloy, Molel Alloy.

High Speed Tool Steels: National, P-D Tungsten.

Nondeforming Tool Steels: HC-HC, Pennant.

D10 Denman & Davis, North Bergen, N. J.

Carbon Tool Steel: Denavis.

High Speed Tool Steel: Denavis.

Special Alloy Steel Drill Rods: Dukane, Monaca.

Free Machining Steel: Jalcase.

Special Open Hearth Steel: D. & D. Special OH.

D12 Detrick, M. H., Co., 140 S. Dearborn St., Chicago.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

D14 Detroit Alloy Steel Co., 6500 Wight St., Detroit.

Alloy Steel Castings: Castaloy, Krokoloy (Chrome-Cobalt), Martin Steel.

Oil Hardening Tool Steel Castings: Carbomang.

D16 Disston, Henry, & Sons Inc., Tacony, Philadelphia.

Carbon Tool Steels: Best D-1, D-2, Extra, Standard, Va Tool.

Special Alloy Tool Steels: Celero, Croloy, D-9-Va, D-29, Eltun, HRW, Keystone Alloy Chisel, Nicroman, Polaris, Special Alloy, 812 Die.

High Speed Tool Steel: D-6-Co, Kutkwik.

Nondeforming Tool Steel: Mansil Oil Hardening.

Corrosion Resisting Alloys: Stainless Iron (Type 410), Stainless Steel (Types 420, 440).

D18 Doehler Die Casting Co., 386 Fourth Ave., New York.

Copper Alloys: Brastil, Do-Di, Doler Brass, Doler Niklbrass, Doler Zink.

Aluminum Alloys: Alculoy, Alniloy, Alsiloy.

Magnesium Alloy: Doler Mag.

D20 Dow Chemical Co., Midland, Mich.

Magnesium Alloys: Dowmetal.

D22 Dravo Corp., Machinery Division, 302 Penn Ave., Pittsburgh.

Steel Grating and Treads: Tri-Lok.

D24 Driver-Harris Co., Harrison, N. J.

Special Alloy Tool Steels: D-H (Types Tool, Special Alloy Tool).

Corrosion, Heat and Wear Resisting Alloys: Chromax, Cimet Cast, D-H (Types Alloy No. 63, Nirosta), Nichrome (Types Cast, Wrought), Veriloy.

Resistance Alloys: D-H Alloy No. 525, Hytemco, Nichrome (Types S and V), Radiohm, Smith Alloy No. 10.

Alloys with Low Coefficient of Expansion: D-H Alloy (Types No. 42 and No. 52).

D26 Driver, Wilbur B., Co., 152 Riverside Ave., Newark, N. J.

Corrosion and Heat Resisting Alloys: Cobanic, Cromin D, Cupron, Modified Hilo, Molymet, Monel, Pure Nickel, Stainless Steel, Tophet (Types A, B, C, D).

D28 Duke Steel Co. Inc., 99 Beekman St., New York.

Carbon Tool Steels: Andard, Duke-Kidd, Durabil, Dutrax, Gralur.

Special Alloy Tool Steels: Dualoy, Dukex, Duvan Die.

High Speed Tool Steel: Duranium.

Nondeforming Tool Steel: Master.

D30 Duraloy Co., Scottdale, Pa.

Corrosion and Heat Resisting Alloys. Duraloy (Types A, B, C, H, H2, N, 18-8, 1535).

D32 Duraweld Metal Products Corp., 41-08 24th St., Long Island City, N. Y.

Ferrous Welding Rods: Duraweld.

D34 Duriron Co. Inc., 450 N. Findley, Dayton, O.

Corrosion and Heat Resisting Alloys: Alcumite, Durco (Types 18-8, 28-12, D-12, D-18, KA2, KA2Mo., KA2S, KA2SMo.), Durichlor, Durimet, Duriron.

-E-

E2 Edgcomb Steel Co., D Below Erie Ave., Philadelphia.

Carbon Tool Steels: Beacon, Ludlum (Types Corinth, Crow, Pompton), Planet Special, Pyramid Special.

Special Alloy Tool Steels: Ludlum Ontario.

High Speed Tool Steels: Ludlum (Types LMW, LXX, ML, Panther Special, Super Panther).

Nondeforming Tool Steels: Ludlum (Types Deward, Huron, Saratoga).

Cemented Carbide: Carboloy.

E6 Electric Steel Foundry Co., 24th & York Sts., Portland, Oreg.

Corrosion and Heat Resisting Stainless Cast Steels: Esco Stainless (Types Nos. 33, 34, 35, 36, 40, 43, 44, 45).

E8 Electro Alloys Co., Elyria, O.

Corrosion and Heat Resisting Alloys: Thermalloy (Types A, B, C, D, 18-8, E 24-12).

E10 Electroloy Co. Inc., 50 Church St., New York.

Copper Alloys for Welding Electrodes: Electroloy, Trodaloy.

E12 Electro Metallurgical Sales Corp., 30 E. 42nd St., New York.

Ferroalloys: Electromet.

E14 Empire Metal Co., Syracuse, N. Y.

Babbitt Metals for Bearings: Emetco.

E16 Empire Sheet & Tin Plate Co., Mansfield, O.

Black Coated Steel Sheets: Black Beauty.

Vitreous Enameling Sheets: Wabik Metal.

Electrical Sheets: Armelec, Dynelec, Manelec, Motelec, Stanelec, Tranelec (Types A, B, C).

E18 Empire Steel Castings Co. Inc., Reading, Pa.

Corrosion, Heat and Wear Resisting Cast Steel: Empire (Types 4, 14, 17, 21, 36, 37, 39, 40).

Nitrided Cast Steel: Nitralloy.

E20 Engelsted, K., 450 Whitlock Ave., New York.

Carbon Tool Steels: Nos. 1 to 8.

Special Alloy Tool Steels: Nos. 9 to 23, Chrome and Tungsten.

High Speed Tool Steels: Nos. 25 to 28.

Nondeforming Tool Steel: Arrow Oil Hardening No. 16.

E22 Erie Malleable Iron Co., 603 W. 12th St., Erie, Pa.

Corrosion and Wear Resisting Malleable Iron: Ermal, Ermalite.

E24 Evans, H. D., Steel Co., 127 Oliver St., Boston.

Carbon Tool Steel: Evans Peerless.

Special Alloy Steel: Halcomb.

Alloy Machinery Steel: White End.

E26 Everard Tap & Die Corp., 213 E. 144th St., New York.

Carbon Tool Steel: Everard.

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F2 Fahralloy Co., Harvey, Ill.

Corrosion and Heat Resisting Alloys: Fahralloy.

F4 Fatitoute Iron & Steel Co., 182 Frelinghuysen Ave., Newark, N. J.

Carbon Tool Steels: Colonial No. 14, Latrobe, Red Star.

High Speed Tool Steels: E.V.M., Gray Cut Cobalt, Red Cut Cobalt, Red Cut Superior.

Special Alloy Tool Steels: Colonial (Types No. 6 and No. 7), Crocar Oil Die, Non-Shrinkable, O-hi-O Air Die, Vanadium "BB".

Cemented Tantalum Carbide: Vascoloy Ramet.

Alloy Machinery Steels: Fisco (Types No. 1, No. 2, No. 3, No. 4).

F6 Fansteel Metallurgical Corp., North Chicago, Ill.

Tantalum Tool Alloy: Tantaloy.

F8 Farrel - Birmingham Co., Ansonia, Conn.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

F10 Farrell-Cheek Steel Co., Sandusky, O.

Abrasion, Wear and Shock Resisting Cast Steel: Farrell's 85.

F12 Federal-Mogul Corp., 11031 Shoemaker St., Detroit.

Bearing Babbitts and Bronzes: Federal Mogul.

F14 Ferner, R. Y., Co., 161 Devonshire St., Boston.

Corrosion and Heat Resisting Alloys: A.R.C., B.T.G., Cromimphy, Elinvar, Imphy, Nicral.

Magnetic Alloys: M.G.N., N.M.H.G., Permax.

Nonmagnetic Alloy: Imphy.

Resistance Alloys: Dilver, Dumet, R.N.C.

Alloys with Low Coefficient of Expansion: Invar, Platinite.

F16 Finkl, A., & Sons Co., 2011 Southport Ave., Chicago.

Special Alloy Steels: Mo-Lyb-Die (Types C, D, R, X).

Hot Work Steel: Durodi.

F18 Firth-Sterling Steel Co., McKeesport, Pa.

Carbon Tool Steels: Best, Diamond "M," Extra, Silver Star, Special A.S.V., Sterling, Sterling "M," Sterling "V," Sterling XX, Vanadium Steel.

Special Alloy Steels: A. W. Special, Chimo Chisel Steel, Cromovan, C.Y.W., Double Special, Extra Special, Extrusion Die (Types "XDH," "XDL," "XDM"), Finis, J.S. Chisel Steel, L.T. Forging Steel, R.T. Steel, Sterling Nitard No. 1, Triple Die, W.D.D.

High Speed Tool Steels: Blue Chip, Circle C, H.M. Blue Chip, H.V. Blue Chip, Hot Work Blue Chip.

Nondeforming Tool Steel: Invaro.

Cemented Carbides: Firthaloy, Firthite.

Corrosion and Heat Resisting Alloys: Sterling Nirosta (Types "FC", KA2, KA2S, 19-9), Sterling Stainless (Types "A", "B", "BHH", "FC", "M", "MG", "T", "TX").

Nitriding Steel: Nitralloy.

Cold Drawn Tool Steels: Blue Chip (Drill Rods), Globe (Polished Drill Rods), Meteor, Needle Wire, Stainless Spring Steel.

F20 Fisher Scientific Co., 711 Forbes St., Pittsburgh.

Corrosion Resisting Nonferrous Alloy: Castaloy.

F22 Florence Pipe Foundry & Machine Co., Florence, N. J.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

F24 Florence-Wehrle Stove Co., Newark, O.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

F26 Forging & Casting Corp., Ferndale, Mich.

Special Alloy Tool Steels: F.C.C. (Type Nos. 1, 2, 5, 6, 7, 10, 11, 14, 19, 20, 21, 22, 23, 25, 26, 27, 34M, 38M, 39, 41M, 44, 46M, 47M, 48M, 49, 53, 66, 5X1).

Cast To Shape: FCC (Types Nos. 17, 55, 66, 5X1, Air Hardening C.M.S., Carbon Tool Steel, Oil Hardening, TMS), PRK-33.

Nitrided Cast Iron: Nitricastiron.

F28 Fort Pitt Steel Casting Co., McKeesport, Pa.

Wear Resisting Alloy Cast Steel: Tufaloy.

F30 Frank Foundries Corp., Moline, Ill.

Corrosion and Heat Resisting Cast Alloys: Frankite (Types E-450, E-821, E-822, E-831, E-832, Ni-Resist, High Chromium).

F32 Fredericksen Co., Saginaw, Mich.

Bearing Bronzes: Sabeco.

F34 Frontier Bronze Corp., Niagara Falls, N. Y.

Bearing Bronzes: Frontier Alloy.

Titanium Bronzes: Frontier Alloy.

F36 Fulton Foundry & Machine Co. Inc., E. 75th & Morgan Ave., Cleveland.

High Strength, Wear Resisting Gray Iron: Meehanite.

—G—

G2 G. H. R. Foundry Co., 400 Detrick St., Dayton, O.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

High Strength Cast Iron: Miarmi Iron.

G4 Gautier, D. G., & Co., 50 Church St., New York.

Carbon Tool Steels: Standard G, Standard G Chisel.

Special Alloy Tool Steels: Extra G, Special G.

G6 General Alloys Co., 367 W. First St., Boston.

Corrosion, Heat and Wear Resisting Alloys: Economet, Genalloy, Q-Alloy (Types "A", A plus, B, "B-Si", C-1, C-2, C-3, C-N-1, CN-1Mo, C-N-2, "CN-1H Mo", K-1 X-7), Q-Alloy Chrome (Types C-1A, C-2A, C-2B, C-2C, C-2D, C-2E, C-3A, CN-1A, CN-1B, CN-1H, CN-1S, CN-2A, J, KA-2, KA-2H, KA-2Mo, KA-2S, KA-4, KNC-3), X-Ite.

G8 General Electric Co., Schenectady, N. Y.

Steel Impregnated with Aluminum: Insuluminum.

Resistance Alloy: Nicaloy.

Special Alloys with Low Coefficient of Expansion: Fernichrome, Fernico.

Permanent Magnet Alloys: Alnic, Alnico.

High Speed Cutting Alloy: 548.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

High Conductivity Copper Alloys: Elkonite, Metite, Trodaloy.

Synthetic Bearing Bronze: Genelite.

G10 General Foundry & Machine Co., Flint, Mich.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

G12 General Iron Works, Box 2490, Denver.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

G14 General Motors Corp., General Motors Bldg., Detroit.

Alloy Cast Iron for Cylinders and Pistons: Cylinder Iron.

G16 Glacier Metal Co., Hull & 22nd St., Richmond, Va.

Babbitt Metal for Bearings: AAI, Genuine Silverine, Genuine Sovereign, Union.

G18 Granite City Steel Co., Granite City, Ill.

Galvanized Sheets: Granite City Galvannealed, Granite City Seal of Quality.

Copper-Bearing Sheets: Granite City, Granite Iron.

Porcelain Enameling Sheets: Granite City.

Electrical Sheets: Granator, Granature, Granelec, Granformer, Granimo, Gransil.

High Strength Low Alloy Steel: Hi-Yield.

Stainless Clad Sheets and Plates: Granite City Ing-A-Clad.

G20 Graphite Metallizing Corp., 1050 Nepperhan Ave., Yonkers, New York.

Copper and Babbitt Metals: Graphalloy.

G22 Great Lakes Steel Corp., Ecorse, Mich.

Vitreous Enameling Sheets: Michigan Metal.

G24 Great Western Steel Co. Inc., 1011 E. 61st St., Los Angeles.

Carbon Tool Steels: Fagersta (Types Hollow Drill, Safety Razor, Special, Standard).

Special Alloy Tool Steels: Dannemora A D 95 Coining Die, Fagersta (Types "30" Drill, Header Die, Hi-Production, Hot Work, Oil Hardening, Piercer, Rock Drill Piston), MiRyCal Chisel, Polhem Drawing Die.

G26 Greenlee Foundry Co., 662 W. Roosevelt Rd., Chicago.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

G28 Gunite Foundries Corp., Rockford, Ill.

Heat Treated White Iron: Z-Metal.

High Test Cast Iron: Gunite.

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H2 Halcomb Steel Division, Crucible Steel Co. of America, Syracuse, N. Y.

Carbon Tool Steels: Extra Special, Extra Warranted, Special, Standard.

Special Alloy Tool Steels: Air Hardening, C. C. S. Die Casting, Double Special, Halco, Halcomb CSM, Haldi, Hoballoy, Krosil, Krovan, Liberty, Marathon, Nu Die, Peerless Cold Header Die, Pyro, Special Vanadium, Thermo, Wortle Die.

Hot Work Steels: Halcomb Hot Work, L. C. T., L. C. T. No. 2, L. L. C. T.

High Speed Tool Steels: Baltoc, Dreadnought, Halcomb 999, Super Dreadnought, Super Van Dreadnought, VM Dreadnought.

Nondeforming Tool Steel: Ketos.

Corrosion and Heat Resisting Alloys: Rezistal (Types KA-2, FM-188, 2-C, KA-2-SMO, 3, 4, 7, 238), Rezistal Stainless (Types Iron No. 12, FM-2, Iron No. 17, Iron No. 20, Iron No. 27, Steel "A", Steel "B", Steel B-100).

H4 Hamilton Foundry & Machine Co., Hamilton, O.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

H6 Hammond & Irving Inc., Auburn, N. Y.

Carbon Tool Steels: Auburn (Types Cast, Extra, Special, Standard).

Special Alloy Tool Steels: Auburn (Types Hot Die, Perfection).

Nondeforming Tool Steel: Auburn Tool Maker.

H8 Handy & Harman Co., 82 Fulton St., New York.

Brazing Alloys: Easy-Flo, Sil-fos.

Silver Solders: Handy.

H10 Harnischfeger Corp., 4411 W. National Ave., Milwaukee.

Ferrous Welding Rods: P & H Smootharc.

H12 Hawkridge Bros. Co., 303 Congress St., Boston.

Carbon Tool Steels: Hawk-Brand, Hawk Impacto, Hawk Special.

Special Alloy Tool Steels: Hawk H, Hawk Vanadium.

Corrosion and Heat Resisting Alloys: Grade B-100 High Carbon, Rezistal, Rezistal Safweld, Rezistal Stainless, Rezistal Stainless Iron, Stainless Steel (Types Grade A, Grade B, H.C.).

H14 Haynes Stellite Co., 30 E. 42nd St., New York.

Nonferrous Cutting Alloys: Haynes Stellite J-Metal, Haynes Stellite-2400.

Corrosion Resisting Alloys: Hastelloy.

Wear Resisting Alloys: Haystellite.

Ferrous Hard Facing Welding Rods: Hascrome.

Nonferrous Hard Facing Welding Rods: Haynes Stellite.

H16 Heller Bros. Co., 879 Mt. Prospect Ave., Newark, N. J.

Carbon Tool Steels: Blue Label Special, Electric Brand White Label, Green Label Extra.

Special Alloy Tool Steels: Brown Label Hot Work, Orange Label Chisel, Yellow Label Die, 70-20 M, 70-20 V.

High Speed Tool Steels: Peerless Red Label, Peerless Special Gold Label.
Nondeforming Tool Steel: Gray Label.

H18 Heppenstall Co., 4620 Hatfield St., Pittsburgh.

Special Alloy Tool Steels: EIS Grades.
Special Alloy Die Steel: Pyrodie.
Corrosion and Heat Resisting Alloys: EIS-45.
High Strength Alloy Steel: Heppenstall Grade 2-C-30.
Abrasion Resisting Alloy Steels: Hardtem, Kleenkut.

H20 Hevi Duty Electric Co., 4212 Highland Ave., Milwaukee.

Resistance Alloy: Smith Alloy No. 10.

H22 Hidalgo Steel Co., 74 Varick St., New York.

Carbon Tool Steels: Janus, Milo, Uranus Extra, Weldo.
Special Alloy Tool Steels: Hidalgo, Special D, Unico, W.3, W.9.
High Speed Tool Steels: Triple Express A, Visto.
Nondeforming Tool Steel: Chrome B 15.
Nontempering Tool Steel: Colosso.
Special Steel for Pneumatic Tools: No. 38 Milo.

H24 Hildebrand, Carl, 1736 Columbus Rd., Cleveland.

Carbon Tool Steel: Sandvik 17.
Special Alloy Tool Steels: Sandvik (Types 20W1V, 12T1, 10T4, 10C2W2, 25T5).
Nondeforming Tool Steel: Sandvik 16T2.

H26 Hills-McCanna Co., 2349 Nelson St., Chicago.

Bronze Alloys: Hills-McCanna.

H28 Hobson, Houghton & Co. Inc., 792 Greenwich St., New York.

Carbon Tool Steels: Choice Drill Rods, Choice XX, Special Tap Rods, Warranted Best.
Special Alloy Tool Steels: Fast Finishing, Soho Self-Hardening.
High Speed Tool Steel: Albion Special.
Nondeforming Tool Steel: Oil Hardening.
Spring Wire and Needle Wire: Houghton's Superior.

H30 Hollup Corp., 3357 W. 47th Pl., Chicago.

Ferrous Welding Rods: Sureweld.

H32 Hoskins Mfg. Co., 4445 Lawton Ave., Detroit.

Heat Resisting Alloys: Chromel (Types A, C and No. 502).
Heating Element Alloys: Chromel (Types A and C).

H34 Houghton & Richards Inc., 145 Oliver St., Boston.

Carbon Tool Steels: Extra Quality, First Quality.
Special Alloy Tool Steels: Gold Label, M.Y., M.Y. Extra, Special K. Die, W.K.Z. Hot Work.
High Speed Tool Steels: Super Rapid Extra, White Label.
Nondeforming Tool Steel: Extra M-G.

H36 Hunt-Spiller Mfg. Corp., 383 Dorchester Ave., Boston.

Nitrided Cast Iron: Nitricastiron.

H38 Hybnickel Alloys Co., Wilmington, Del.

Corrosion and Heat Resisting Alloys: Hybnickel (Types A, B, C, D, R, S).

H40 Hyde Park Foundry & Machine Co., Hyde Park, Pa.

Heat Treated Chilled Cast Iron Rolls: Red Circle.

H42 Hydril Co., 714 W. Olympic Blvd., Los Angeles.

Bearing Bronze: Hydril.

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I2 Illinois Zinc Co., 332 S. Michigan Ave., Chicago.

Zinc Alloys: Eraydo.

I4 Industrial Steel Casting Co. Division, Unitcast Corp., Box C, Sta. E, Toledo, O.

Carburizing Cast Steel: Toledo Alloy No. 3.
Abrasion Resisting Cast Steel: Toledo Alloy No. 4.
Nondeforming Cast-to-Shape Die Steel: Toledo Alloy No. 6.
Shock Resisting Cast Steel: Toledo Alloy No. 7.
Heavy Duty High Tensile Cast Steel: Toledo Alloy No. 8.

I6 Industrial Steels Inc., 250 Bent St., East Cambridge, Mass.

Corrosion and Heat Resisting Alloys: Industrial (Types 12, 12T, 18, 35, 65, 100, 188, 188S, 188SMO, 199, 199U, 512, 5188).

I8 Ingersoll Steel & Disc Division, Borg-Warner Corp., 310 S. Michigan Ave., Chicago.

Tool Steels: Ingersoll.
Special Alloy Steels: Super-Alloy, Temcross.
Stainless Clad Steel: IngAclad.

I10 Inland Steel Co., 38 S. Dearborn St., Chicago.

High Strength, High Corrosion Resistant Alloy: Inland Hi-Steel.
Galvanized Sheets: Inland.
Cold Reduced Tin Plate: Inland.
Copper-Bearing Steel in All Forms: Inland Copper-Alloy.
Steel Floor Plates and Sheet Piling: Inland.

I12 International Development Corp., 330 W. 42nd St., New York.

Copper Alloys: A. R. Alloy, Admiro, Admos, D. G. Alloy, Rubel Bronze, Rubelit, Topal, Turbo.

I14 International Nickel Co. Inc., 67 Wall St., New York.

Corrosion, Heat and Wear Resisting Cast Irons: Nickel Cast Iron, Ni-Hard, Ni-Resist, Ni-Resist Copper Free, Ni-Tensyliron.
High Tensile Cast Iron: High Test, Ni-Tensyliron.
Corrosion Resisting Nickel Alloys: Inconel, Monel Metal, "H" Monel, "R" Monel, "R" Monel, "S" Monel, "A" Nickel, "D" Nickel, "Z" Nickel, Nickel-Clad Steel.

I16 Inter-State Foundry & Machine Co., Johnson City, Tenn.

Stainless Steel Castings: KA-2.

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J2 Janney Cylinder Co. Inc., 7425 State Rd., Philadelphia.

Nickel Bronze: Nickeldur.

J4 Jeffrey Mfg. Co., First Ave. & Big Four R. R., Columbus, O.

Wear Resisting Cast Iron: Jefaloy.
High Strength Malleable Iron: Perduro, Supermal.

J6 Jelliff, C. O., Mfg. Corp., Southport, Conn.

Resistance Alloys: Jelliff Alloy (Types 45, 70, A, C, D), Kanthal (Types A, A-1, D).

J8 Jessop Steel Co., Washington, Pa.

Carbon Tool Steels: Centaur, Chippeway, Domestic, Lion, Miner's Drill, Utilitas, Washington.
Special Alloy Tool Steels: Alloy, 2 B Hot Die, High Carbon, Hot Stamping Alloy Die, J J Hot Work, L.C.H.S. Chisel, Rapid Finishing, Shock Resisting, Special Alloy, Special Oil Hardening, Top Notch, Zip-Zip Chisel.
High Speed Tool Steels: Jessco, Purple Label, Mogul, Special, Supremus, Supremus Extra.
Nondeforming Tool Steels: 3-C Die, Truform, Truform Special.
Corrosion and Heat Resisting Alloys: Duro-Gloss (Types C1, C2, C2-2, C3, C4, C12, 5), Heat Resisting (Types No. 4, No. 5), Hi-Gloss, Sta-Gloss, Sta-Gloss B.

J10 Jessop, William, & Sons Inc., 121 Varick St., New York.

Carbon Tool Steels: W.J.S. (Types Extra Best Crucible Cast Steel, Extra Best Sheet Crucible Cast Steel, Extra Tool Steel, Ordinary Tool Steel, Special Crucible Cast Steel).
Special Alloy Tool Steels: Albor, Alloy B, Alloy C, Ark Superior, Ark Superlative, Ark Supreme, BB. Hot Die, Circular Saw Plates, Composite Die, Hack Saw, J-4 Chisel, Superior Oil Hardening.
Stainless Steels: Corrosion Resistant (Types R-1, R-2, R-3, R-4).

J12 Jewell Steel & Malleable Co. Inc., 373 Hertel Ave., Buffalo.

Heat Resisting Cast Alloy: Jewell Alloy.
Alloy Cast Steel: Jewell Alloy (Types 42, S, V).

J14 Johnson, A., & Co. Inc., 1270 Sixth Ave., New York.

Stainless Steels: Avesta (Types Nos. 249, 249H, 254, 393, 393S, 739, 739H, 831, 831H, 832, 832S).

J16 Johnson Bronze Co., New Castle Pa.

Babbitt and Bronze Bearing Metals: Johnson.

J18 Jones & Laughlin Steel Corp., 311 Ross St., Pittsburgh.

High Tensile Steel: Jal-Ten.
Free Machining Steel: Jalcase.
Special Tin Plate: Jalcold.
Oxygen Welded Pipe and Tubing: Jalweld.
Concrete Bridge Floor Reinforcement: Jaltruss.
Galvanized Roofing and Siding: Jalseal.

Seamless Integral Joint Drill Pipe: I-J Drill Pipe.

J20 Joslyn Co., 70 Pine St., New York

Rolled Copper Steel: Copper Steel.

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K2 Kahl, Frederick, Iron Foundry, 211 E. Atwater St., Detroit.

Alloy Cast Iron: Nickahl.

K4 Kahl-Holt Co., 111 S. Charles St., Baltimore.

Corrosion and Heat Resisting Alloy: Ka-HoLoy.

K6 Kanawha Mfg. Co., Charleston, W. Va.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

K8 Kay-Brunner Steel Products Inc., 2721 Elm St., Los Angeles.

Corrosion, Heat and Wear Resisting Gray Iron: Ni-Hard, Ni-Resist.

K10 Kidd Drawn Steel Co., Aliquippa, Pa.

Carbon Tool Steels: Ajax Drill Rod, Invincible Drill Rod, Unito Drill Rod.

Special Alloy Tool Steel: Special Vanadium.

K12 Kinite Corp., 1400 E. Park Pl., Milwaukee.

Special Alloy Tool Steel, Cast or Rolled: Kinite, K.O.H.

Special Alloy Electrical Irons and Steels: XX Metal.

K14 Kinney Iron Works, 2525 E. 49th St., Los Angeles.

Corrosion, Heat and Wear Resisting Gray Irons: Kinnalloy, Kinnite, Meehanite.

K16 Kloster Steel Corp., 1036 W. Lake St., Chicago.

Carbon Tool Steels: Pure-Ore (Types Standard, Extra, Special).

Special Alloy Tool Steels: Chiz-Alloy, Dannemora (Types A-D 70, A-D 95, No. 10, No. 14), Kloster (Types D-65 Hi-Chrome Hi-Carbon, D-66 Hot Work, D-C 33 Hot Work, Z-457 Die Cast), Pure Ore (Types Double Special, Hi-Chrome Hi-Carbon, Super Alloy).

Nondeforming Tool Steel: Swed-Oil.

High Speed Tool Steel: Prior Extra, Pure-Ore Cobalt.

Swedish Iron: Ram Brand.

K18 Koehring Co., 3026 Concordia Ave., Milwaukee.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

K20 Krupp-Nirosta Co. Inc., 27 William St., New York.

Licensing Corporation for Krupp Nirosta Stainless Steel.

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L2 La Bour Co., Elkhart, Ind.

Corrosion Resisting Alloys: La Bour Elcomet (Types G-60, K, R-55).

L4 Laclede Steel Co., Arcade Bldg., St. Louis.

Strip, Wire, Pipe, Bars: Laclede.

L6 Lake City Malleable Co., 5060 Lakeside Ave., Cleveland.

Malleable Iron: Shock-Proof.

L8 LaSalle Steel Co., Box 6800-A, Chicago.

Cold Finished Steels: La Salle Structured.

Hot Rolled Annealed, Normalized or Heat Treated Steel Bars: Gold Tip, Manganese Screw Stock, Silver Tip, Tritex, Tuftork, 1020-90.

L10 Latrobe Electric Steel Co., Latrobe, Pa.

Carbon Tool Steels: Cold Header Carbon, Extra Carbon, L.C., Special Carbon, Standard Carbon.

Special Alloy Tool Steels: Aldivan, Arrow, CC Chisel, C.F.S., Crown, Dy-Cast No. 1, E.H.W. (Types No. 1, No. 2, No. 3), Extra Special Alloy, G.S.N., G.S.N. Special, Invar, Lumdie, M Chrome, M Chrome Mo., P.X.D., Renown, Select, Select "B", Staminal, Superb, Supreme, Truedge, W Tap, W.W.S.H., X.L. Chisel, Z. T. Die.

High Speed Tool Steels: Electrite (Types No. 1, No. 19, Cobalt, Super Cobalt, Ultra Cobalt, Uranium, Uranium No. 2, Uranium "B", Vanadium), Tatmo.

Nondeforming Tool Steels: Mangano, Mangano Special.

Magnet Steels: Cobalt Magnet, Tungsten Magnet.

Corrosion and Heat Resisting Alloys: Lesco Stainless Iron (Types "H", "HH", "L", "LM", "LS", "18-8", "18-8-Mo", "18-8-S", "18-8-Se", "25-12", "25-20"), Stainless Steel (Types EZ, Hy-Glo, Lusterite, Regular).

Miscellaneous Alloy Steels: Duo-Composite Steels.

L12 Lebanon Steel Foundry, Lebanon, Pa.

Alloy Cast Steels: Circle L (Types 1, 2, 5, 9, 10, 19).

Corrosion, Heat and Wear Resisting Cast Steels: Circle L (Types 3, 6, 11, 12, 13, 14, 15, 22, 23, 24, 25, 30, 31, 32, 34, 40, 41, 42, 43, 44, 45, 46, 47, 48).

Nitrided Cast Steel: Circle L-8 (Nitralloy).

L14 Lehigh Babbitt Co., Allentown, Pa.

Graphite and Babbitt Metals: Grapho Babbitt.

L16 Lehigh Steel Co., Bethune & Greenwich Sts., New York.

Carbon Tool Steels: Lehigh (Types Conquer, Special No. 3 and No. 5).

Special Alloy Tool Steels: Lehigh Croma.

High Speed Tool Steels: Lehigh (Types XXX, Super Special).

Nontempering Tool Steel: Leco.

Air Hardening Tool Steel: Hyco.

Nondeforming Die Steel: Torpedo.

Hot Punch and Die Steel: Ferno.

Drill Rods: Apex.

L18 Lewin Metals Corp., Mississippi Ave. & A. S. R. R., East St. Louis, Ill.

Babbitt Metal for Bearings: Marine Nickel.

L20 Lincoln Electric Co., 12818 Coit Rd., Cleveland.

Ferrous Welding Rods: Abrasoweld, Chromeweld, Ferroweld, Fleetweld, Hardweld, Lightweld, Manganweld, New Kathode, Shield-Arc, Stable-Arc, Stainweld, Toolweld, Transweld, Wearweld.

Nonferrous Welding Rods: Aerisweld, Aluminweld, Anode.

L22 Linde Air Products Co., 30 E. 42nd St., New York.

Ferrous and Nonferrous Welding Rods: Oxweld.

L24 Link-Belt Co., 220 S. Belmont Ave., Indianapolis.

High Strength Malleable Cast Iron: Promal.

L26 Locomotive Finished Material Co., Atchison, Kans.

Corrosion Resisting Alloy: L.F.M. Co. 4-6 Chrome-Molybdenum.

L28 Logan Iron & Steel Co., 1373 Broad St. Station Bldg., Philadelphia.

Staybolt Iron: Logan.

Double Refined Engine Bolt Iron: Lisco

Single Refined Engine Bolt Iron: Lico.

L30 Ludlum Foundry, 3445 River Rd., Buffalo.

Heat Resisting and Stainless Cast Alloys: Silcrome.

L32 Ludlum Steel Co., Watervliet, N. Y.

Carbon Tool Steels: Corinth, Pompton, Pompton Extra, Pompton Special.

Special Alloy Tool Steels: Albany, Atlas 93, Caroga, Crow, LSD, Python, Seminole, Special M, Teton, XCM, 602.

High Speed Steels: LMW, LXX, ML, Panther Special, Super Panther, VLM.

Hot Work Steels: Atlas (Types A and B), EB Alloy, Mohawk.

Nondeforming Tool Steels: Deward, Huron, Ontario, Saratoga, Utica.

Rust Resisting Steels: Silcrome (Types 18-8, 18-8S, 18-8-EZ, 25-20, 25-12, 18-8-M, 18-8-C, 12, 12-2, L-12, 17, RA, M-17, H-17, 12-EZ).

Nitriding Steels: Nitralloy (Types G, H, EZ).

Nitrided Cast Iron: Nitricastiron.

L34 Lukens Steel Co., Coatesville, Pa.

High Strength Alloy Steels: Lukens (Types Carbon-Molybdenum, Chrome-Vanadium, Cromansil, Manganese-Vanadium, Nickel, Silico-Manganese).

Welding Steels: Lukens Welding Quality.

Abrasion-Resisting Steels: Lukens (Types Chrome - Manganese, Chrome - Nickel, Manganese).

Corrosion Resisting Clad Metals: Lukens Types Inconel-Clad, Nickel-Clad).

L36 Lumen Bearing Co., 197 Lathrop St., Buffalo.

Babbitt Metals: Cosmos, Lotus, Old Genuine, Stannum Metal.

Bearing, Strength and Gear Bronzes: Lumen Alloy.

L38 Lunkenheimer Co., Beekman & Waverly Aves., Cincinnati.

Corrosion and Wear Resisting Nonferrous Alloy: NS-5.

L40 Lynchburg Foundry Co. Inc., Lynchburg, Va.

Alloy Cast Iron: Lyncast.

L42 Lyon, Conklin & Co. Inc., Race & McComas Sts., Baltimore.

Rust Resisting Iron Alloy: Lyonore Metal.

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M2 Mackenzie's, Duncan, Sons Co. Inc., Trenton, N. J.

Heat Resisting Alloy: Mackenite Metal.

M4 Mackintosh-Hemphill Co., 901 Bingham St., Pittsburgh.

High Strength Alloy Steels: MacHempIte Wearprooft.

Wear Resisting Steels: Adamite.

Wear Resisting Irons: Adamite, Iralite.

M6 Magnolia Metal Co., Elizabeth, N. J.

Bearing Bronze: Magnolia.

Babbitt Metal for Bearings: Adamant Super-Genuine.

M8 Malleable Iron Fittings Co., Branford, Conn.

High Strength Cast Iron: Van-Nic.

M10 Mallory, P. R., & Co., 3029 E. Washington St., Indianapolis.

Copper Alloy Welding Electrodes: Elkaloy, Elkonite, Mallory, Soldaloy, Trodaloy.

Electrical Contact Alloy: Elkonium.

M12 Manganese Steel Forge Co., Allen St. & Castor Ave., Philadelphia.

Rolled and Forged Alloy Steels: Armor, Rol-Man.

Manganese Steel Welding Rods: Rol-Man.

M14 Marshall Stove Co., Lewisburg Tenn.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

M16 Massillon Steel Casting Co., Massillon, O.

Alloy Cast Steel: Massalloy, Tigerloy.

Nitrided Cast Steel: Nitralloy.

M18 Maurath Inc., 7301 Union Ave., Cleveland.

Stainless and Heat Resisting Alloy Welding Rods: Maurath.

M20 Maywood Chemical Works, Maywood, N. J.

Aluminum Alloys: B-Metal, Silumin.

M22 McCallum-Hatch Bronze Co. Inc., 27 Carolina, Buffalo.

Bearing Bronzes: M-H Alloy.

M24 McDonald, P. F., & Co., 17 King Terminal, Boston.

Carbon Tool Steels: Macco Brand, Macco Certified, Macco Superior, Macco Swedish.

Special Alloy Tool Steels: Macco Fool-Proof Chisel, Kromax, Royal Crown Oil Hardening, Chrome Tungsten, Swedish Vanadium, Hot Die, Air Hardening Trimmer Die.

High Speed Tool Steels: Macco Enormous, Maccomax, Macco Radio.

M26 McGill Mfg. Co., Valparaiso, Ind.

Aluminum Bronze for Die Casting: McGill Metal.

Hard Brass for Die Casting: McGill.

M28 McInnes Steel Co., Corry, Pa.

Carbon Tool Steels: McInnes Special, Misco (Types "A" and "B"), Superior.

Special Alloy Tool Steels: S No. 4 Tungsten Chisel, Special Chrome-Nickel, Vanadium Crucible.

High Speed Tool Steels: Cobalt High Speed, Record "A", "V" High Speed.

Nondeforming Tool Steels: Cello Vanadium.

Brake Die Steel: McInnes Folder Die.

M30 McKay Co., McKay Bldg., Pittsburgh.

Ferrous Welding Rods: McKay.

M32 Meehanite Metal Corp., 323 Fourth Ave., Pittsburgh.

High Strength Sorbo-Pearlitic Gray Cast Iron Resistant to High Temperature Corrosion and Wear: Meehanite. (Produced under license by this corporation. For names of licensees, see "Meehanite" in Part II of Directory).

M34 Merco Nordstrom Valve Co., 400 N. Lexington Ave., Pittsburgh.

Copper Alloy: Mercoloy.

M36 Mesta Machine Co., P. O. Box 1466, Pittsburgh.

Alloy Cast Steel for Rolls: Mesta Special.

M38 Metal Carbides Corp., Youngstown, O.

Tungsten Carbide Alloy: Talide.

M40 Metal & Thermit Corp., 120 Broadway, New York.

Steel Welding Rods: Murex.

Special Metals and Ferroalloys: M. & T.

M42 Michiana Products Corp., Michigan City, Ind.

Corrosion and Heat Resisting Alloys: Fire Armor, Fire Armor "B", Michiana (Types No. 48, No. 49, No. 55, No. 63, No. 100), Zorite.

M44 Michigan Steel Casting Co., 1986 Guoin St., Detroit.

Heat and Corrosion Resisting Alloys: Misco (Types "B", "C", HN, "N", 18-8), Misco Metal, Miscrome (Types CR, KR, 1, 2, 3), Ni-Resist.

M45 Michigan Tool Co., 7171 E. McNichols Rd., Detroit.

Tungsten-Cobalt-Chromium Cutting Alloy: Mitco Crobalt.

M46 Midvale Co., Nicetown, Philadelphia.

Carbon Tool Steels: Die Block, Extra Carbon Tool, Hollow Drill, Mining Drill, Regular Carbon Tool, Smooth'ole, Smooth'ole Hollow Drill, Solid Mining Drill, Special Carbon Steel.

Special Alloy Tool Steels: Bit and Jar Steel, Bolt Die (Types Regular and Special), Die Block C, Duredge Chisel, Finishing (Types Regular and Special), Multole Punch, No. 77 Tool Steel, Nut Piercer, Salvo Rivet Set, Tool Holder.

High Speed Tool Steels: Five Star, One Star, Three Star, Two Star.

Nondeforming Tool Steels: Constant, Diamond Brand.

Corrosion and Heat Resisting Alloys: Midvaloy (Types Aerovalve, AMF, ATV-1, ATV-3, BTG, FC Stainless, HR-1, HY-X, 13-00, 13-00 A, 17-00, 18-35 A, 18-08, 18-08 Se, 20-60, 21-00, 21-00 Cu, 25-10, 25-10 B, 25-20, 25-20 B, 26-02, 26-02 Z, 30-30, 976).

M48 Milne, A., & Co., 915 Oliver Bldg., Boston.

Carbon Tool Steels: Green Label, Hollow Drill, Orange Label, Red Label, Solid Drill, Spiral Drill, White Label.

Special Alloy Tool Steels: AO 20, MSM.

High Speed Tool Steels: AMC High Speed, HYCO High Speed.

Nondeforming Tool Steels: AMCOH Oil Hardening.

M50 Milwaukee Steel Foundry Co., 435 S. Water St., Milwaukee.

Corrosion and Heat Resisting Cast Steel: Milwaloy.

Nitrided Cast Steel: Nitralloy.

M52 Moltrup Steel Products Co., Beaver Falls, Pa.

Cold Drawn Steels: Moltrup.

M54 Monarch Steel Co., 545 W. McCarty St., Indianapolis, Ind.

Cold Finished Steels: Speed Case.

M56 Moraine Products Co., 330 E. First St., Dayton, O.

Bearing Bronzes: Durex, Moraine.

M58 Motor Castings Co., 1111 E. 65th St., Milwaukee.

Alloy Cast Iron: Mocasco, Moheco, Ni-Resist.

M60 Mueller Brass Co., Port Huron, Mich.

Copper Alloys: Tuf-Stuff, Mueller 600 Bronze.

Forging Brass: Relleum.

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N2 Nassau Smelting & Refining Co., 50 Church St., New York.

Babbitt Metal for Bearings: Argus.

N4 National Alloy Steel Division, Blaw-Knox Co., Blawnox, Pa.

Corrosion and Heat Resisting Castings: NA-1, NA-2, NA-4, NA-4M, NA-18, NA-19, NA-65.

N6 National Bearing Metals Corp., 4930 Manchester Ave., St. Louis.

Bearing Bronzes: Arctic, Damascus, Keystone, More-Jones, Tiger.

Babbitt Metals: Alpha Crusher, Armature, Beta Crusher, Extra Copper Hardened, Hoo-Hoo, Improved, Mill Bearing, Nickel, Phosphor Bronze, Regent, Universal.

N8 National Bronze & Aluminum Foundry Co., E. 88th & Laisy Ave., Cleveland.

Aluminum-Copper Alloy: Tenual.

N10 National-Erie Corp., Erie, Pa.

Alloy Machinery Steel: Neloy.

N12 National Forge & Ordnance Co., Irvine, Warren County, Pa.

Corrosion and Heat Resisting Alloys: Nationalloy (Grades 1, 2 and 3).

N14 National Lead Co., 111 Broadway, New York.

Babbitt Metal for Bearings: Dutch Boy, Heavy Pressure, Hoyt, Perfection Anti-Friction, Phoenix.

Acid Resisting Sheet Lead: Tellurium.

Lead Pipe: Tellurium.

N16 National Malleable & Steel Castings Co., 10600 Quincy Ave., Cleveland.

Alloy Cast Steel: Naco Steel.

Malleable Cast Iron: Mallix, Promal.

Magnetic Alloys: Magnel, Magno.

N18 National Smelting Works, 6700 Grant Ave., Cleveland.

Aluminum Alloys: National.

N20 National Tube Co., Frick Bldg., Pittsburgh.

Seamless Mechanical Tubing and Chrome-Molybdenum Aircraft Tubing: Shelby.

High Strength Low Alloy Steel Pressure Pipe and Tubes and Copper-Steel Pipe: National.

Stainless and Heat Resisting Steel Pipe and Tubes: National USS.

N22 New Jersey Zinc Co., 160 Front St., New York.

Zinc Alloys: Horse Head, Zamak, Zilloy.

N24 Newport Rolling Mill Co., Newport, Ky.

Copper-Bearing Pure Iron: Gohi.

Copper-Bearing Steel: Kentucky.

N26 Niagara Falls Smelting & Refining Corp., 2208 Elmwood Ave., Buffalo.

Aluminum Alloys: Lynite, Macadamite.

Nonferrous Alloying Elements: Cataract Metal, Niagara, Ruinella.

N28 Nicralumin Co., Jackson, Mich.

Aluminum Alloys: Nicral.

N30 Nitralloy Corp., 230 Park Ave., New York.

Special Composition Rolled and Cast Steel for Surface Hardening by Nitriding Process: Nitralloy. (Produced under license by this corporation. For names of licensees, see "Nitralloy" in Part II of Directory).

N32 Nitricastiron Corp., 230 Park Ave., New York.

Special Composition Cast Iron for Surface Hardening by Nitriding Process: Nitricastiron. (Produced under license by this corporation. For names of licensees, see "Nitricastiron" in Part II of Directory.

N34 Northeast Metals Co., 4100 Paul St., Philadelphia.

Nonferrous Welding Rods: Arc-wel.

N36 Northfield Iron Co., Northfield, Minn.

Corrosion Resisting Steel: Nico.

Special Alloy Steel for Road Machine Cutting Edges: Blue Diamond.

N38 Norton Co., Worcester, Mass.

Boron Carbide Abrasion Resisting Material: Norbide.

—O—

O2 Ohio Brass Co., Mansfield, O.

Special Malleable Iron: Flecto Iron.

O4 Ohio Ferro Alloys Corp., Canton, O.

Ferroalloys: Philo Brand.

O6 Ohio Steel Foundry Co., Lima, O.

Corrosion and Heat Resisting Alloys: Fahrite (Types N-1, N-2, N-3, N-4, N-5, N-6).

Alloy Cast Steel: Hioloy.

Hard Alloys for Rolls: Denso Iron, Flintuff, Ohioloy.

O8 Otis Elevator Co., 162 Grider St., Buffalo.

Alloy Cast Steels: Otisel (Types O-2, O-3, O-4, O-5, O-6, O-7, O-8, O-9, O-10, O-D, O-H, O-M, O-S).

Corrosion and Heat Resisting Cast Alloys: Otisel (Types 1, 2, 3, 4, 5).

—P—

P2 Pacific Foundry Co., 3100 19th St., San Francisco.

Corrosion, and Wear Resisting Cast Alloys: Corrosiron, Flintcast, Ni-Resist, Nirosta KA2, Pyrocast.

High Strength Alloy Cast Iron: Ferrotite.

P4 Pacific Metal Co., 303 N. W. Park Ave., Portland, Ore.

Babbitt Metal for Bearings: Nickeloid.

P6 Page Steel & Wire Division, American Chain Co., Monessen, Pa.

Stainless Steel Wire: Page-Allegheny (Types 33, 33 Free Machining Quality, 33 Non-Hardening Quality, 33 Turbine Quality, 33-W, 44, 55, 66, 66-W, 67, 88 Non-Magnetic, 2520 Electric Metal [Nicaloi], Ohmaloy), Page-Allegheny Metal (Types A-Mo, A-TI, B-TI).

Ferrous Welding Rods: Page.

P8 Paragon Steel & Tool Co., East Rutherford, N. J.

Carbon Tool Steels: Parasteel, Swedesteel.

Special Alloy Tool Steels: Parasteel, Swedesteel.

High Speed Tool Steels: Parasteel, Swedesteel.

P10 Parker Appliance Co., 17325 Euclid Ave., Cleveland.

Copper Alloy: Valve Copper.

P12 Patriarche & Bell Inc., 53 Carmine St., New York.

Carbon Tool Steels: Dynamo, P. B.

Spring Steel Products: P. & B.

P14 Peninsular Steel Co., 1030 McDougall Ave., Detroit.

Carbon Tool Steels: Blue Label, Cold Header Die, Penco, Red Label.

Special Alloy Tool Steels: Bethlehem (Types Fast Finishing, High Speed, Hot Work), Black Label, Hollobar, Pen Van, Special No. 18.

Nondeforming Tool Steels: Arrow Oil Hardening, Tri-Mo, White Label, Yellow Label.

P16 Pennsylvania Electric Steel Casting Co., Hamburg, Pa.

Corrosion and Wear Resisting Cast Steel: Pennalloy (Types A, B, C, D).

P18 Phelps Dodge Copper Products Corp., 40 Wall St., New York.

Silicon Bronze: P.M.G.

P20 Phosphor Bronze Smelting Co., 2202 Washington Ave., Philadelphia.

Copper Alloys: Delta Bronze, Delta Metal, Deltoid, Dixtrudo.

P22 Pioneer Alloy Products Co., 16601 Euclid Ave., Cleveland.

Heat Resisting Cr-Ni-Mo Alloy: Pioneer.

Acid Resisting Ni-Cr-Mo Alloy: Pioneer.

P24 Pittsburgh Brass Mfg. Co., Penn Ave. at 32nd St., Pittsburgh.

Aluminum Alloy: Alunyte.

Bearing Bronze: Lubrik.

P26 Pittsburgh Crucible Steel Co., Oliver Bldg., Pittsburgh.

Alloy Machinery Steels: M.P.M.3C, Maxel.

P28 Pittsburgh Metallurgical Co. Inc., Niagara Falls, N. Y.

Ferroalloys: Niagara Brand.

P30 Pittsburgh Rolls Corp., 41st & Willow St., Pittsburgh.

Alloy Cast Iron: Phoenix (Types K, Metal, Molybdenum Chill, Nickel Chill), Phoenixloy.

Alloy Cast Steel: Phoenix (Type A, A Special, Piroco).

P32 Pittsburgh Steel Co., 1647 Grant Bldg., Pittsburgh.

Seamless Pipe and Tubing: Pittsburgh Seamless.

Wire and Wire Products: Pittsburgh, Pittsburgh Stainless.

Steel Welding Wire: Pittsburgh.

P34 Pittsburgh Steel Foundry Corp., Glassport, Pa.

Alloy Cast Steel: Pitaloy.

P36 Pittsburgh Tool Steel Wire Co., Monaca, Pa.

Carbon Tool Steels: Dukane, Dukane Drill Rod, Monaca, Monaca Drill Rod, Monaca Special, Reliance, Reliance Drill Rod.

Special Alloy Tool Steel: Special Tungsten Alloy.

High Speed Tool Steel: High Speed.

P40 Plykrome Corp., 1 Wall St., New York.

Stainless Clad Steel: Plykrome.

P42 Potts, Horace T., Co., E. Erie & D St., Philadelphia.

Carbon Tool Steel: Trojan.

Machinery Steels: Elastuf (Grades Media, Penn).

Alloy Steels, Heat Treated: Elastuf (Grades A, Chro-Moly, SAE 3140).

Alloy Steels, Untreated: Elastuf (Grades SAE 2335, SAE 3140).

Abrasion Resisting Plate Steels: Elastuf Media, Weartuf.

P44 Precision Castings Co. Inc., Syracuse, N. Y.

Aluminum Alloys: Precision, Renyx.

P46 Prentiss, George W., & Co., Holyoke, Mass.

Copper-Nickel Resistance Wire: Cunic.

P48 Prescott Co., Menominee, Mich.

Alloy Cast Iron: Sigeron Metal.

P50 Prosser, Thomas, & Son, 120 Wall St., New York.

Carbon Tool Steel: Krupp Carbon.

Special Alloy Tool Steel: Krupp Special.

High Speed Tool Steel: Krupp High Speed.

Nondeforming Tool Steel: Krupp Non-Deforming.

P52 Purdy, A. R., Co. Inc., 790 Greenwich St., New York.

Carbon Tool Steels: Planet (Types Choice, Drill Rod, Extra, Regular, Special), Purco Chisel.

High Speed Tool Steels: Planet (Types High Speed, Nonshrinking, X9).

Alloy Steel: Planet Silico Manganese Spring Steel.

—Q—

Q2 Q & C Co., 90 West St., New York.

Heat and Abrasion Resisting Alloy: Nogroth.

—R—

R4 Reading Iron Co., Reading, Pa.

Wrought Iron: Nordic, Reading.

R6 Reliance Steel Casting Co., 2852 Penn Ave., Pittsburgh.

Alloy Cast Steel: Reliance.

R8 Republic Steel Corp., Republic Bldg., Cleveland.

Carbon Tool Steels: Bourne-Fuller (Types Extra, Extra Special, Standard, Tool).

Special Alloy Tool Steels: Bourne-Fuller (Air Hardening, Dumost, Velvet, XX Superior).

High Speed Tool Steels: Bourne-Fuller (Types High Speed, IXL).

Nondeforming Tool Steel: Bourne-Fuller Arrestite.

Corrosion and Heat Resisting Alloys: Enduro.

High Strength Alloy Steels: Republic Double Strength Steel.

Copper-Molybdenum Iron: Toncan.

Alloy Steels: Agathon.

Nitriding Steel: Nitralloy.

R10 Resisto-Loy Co., Grand Rapids, Mich.

Corrosion and Abrasion Resisting Iron Alloys: Isorod, Resisto-Loy.

R12 Revere Copper & Brass Inc., 230 Park Ave., New York.

Copper Alloys: Herculoy, Revere.

Bearing Bronze: Roman Bronze.

Bronze Welding Rods: Herculoy, Manganese, Naval, Phosphor, Roman, Weld-Fast.

R14 Rhoades, R. W., Metaline Co. Inc., Box 1, Long Island City. N. Y.

Bearing Bronze: Metaline.

R16 Riverside Metal Co., Riverside, N. J.

Copper Alloys: Omega, Riverside, Trodaloy.

Phosphor Bronze: Omega.

Nickel Silver Alloys: Omega.

R18 Robbins Conveying Belt Co., Passaic, N. J.

Abrasion Resisting Cast Iron: Ni-Hard.

R20 Roebling's, John A., Sons Co., Trenton, N. J.

Steel Wire and Welding Wire: Roebling.

R22 Rosedale Foundry & Machine Co., 1731 Preble Ave., Pittsburgh.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

R24 Ross-Meehan Foundries, 1601 Carter St., Chattanooga, Tenn.

Alloy Cast Steels: Ross-Meehan.

Corrosion, Heat and Wear Resisting Gray Irons: Meehanite, Ni-Hard, Ni-Resist.

R26 Ruselite Corp., 1025 N. Fourth St., Milwaukee.

Aluminum Alloy: Ruselite.

Copper Alloy: Tantalum Bronze.

R28 Rustless Iron & Steel Corp., 3400 E. Chase St., Baltimore.

Stainless Steels: Defiheat, Defirust, Defirust Machining, Defistain (Grades 18-8, Machining 18-8), Rustless (Grades 13-HC-35, 17, 17FM, 17-HC-60, 17-HC-90, 20-10, 25-12).

R30 Ryerson, Joseph T., & Son Inc., 16th & Rockwell Sts., Chicago.

Tool Steels: Ryerson (Types B. F. D. Steel, Shock Steel, High Speed Steel, V. D. Steel).

Special Alloy Steels: Nikrome "M", Ryax, Ry-arm, Ryco, Rycrome, Rytense A. A.

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S2 S K F Steels Inc., 369 Lexington Ave., New York.

Carbon Tool Steel: SKF 100.

Nondeforming Steel: SKF 46.

Alloy Steels: SKF (Types 1, 3, 7, 9, 13, 22, 36, 48, 711).

Round and Flat Wire Rods, Hollow and Solid Drill Steel, Chrome Steel Tubes, Bars and Billets: SKF.

S4 Sandusky Foundry & Machine Co., Sandusky, O.

Centrifugally Cast Bronze: Sandusky 1-N.

S6 Sandvik Steel Inc., Woolworth Bldg., New York.

Corrosion Resisting Steels: Sandvik (Types No. 2C27, No. 2C34, No. 2R1, No. 2R2, No. 2R3).

Corrosion and Heat Resisting Steels: Sandvik (Types No. 2C40, No. 4C-48, No. 7).

Case Hardening Steel: Sandvik No. 2N-3C-1.

Carburizing Steels: Sandvik (Types No. 2N5, No. 3N-3, No. 3N-5, No. 3N-4C-2, No. 3S).

Alloy Machinery Steels: Sandvik (Types No. 4N-3C-2, No. 6N-3C-2, No. 6N-4C-2, No. 7N-3C-3, No. 8M-C-27, No. 8N, No. 8N-1C-2, No. 8N-3, No. 8).

Magnet Irons: Sandvik (Types 2MF, 2MFX).

Magnet Steels: Sandvik (Types 12W12-C-1, 13W12C, 16C6).

S8 Sargent & Co., New Haven, Conn.

Copper Alloy: Eclipse Bronze.

S10 Scientific Alloys Inc., 712 E. Slauson Ave., Los Angeles.

Metal Process Alloy for Catalyzing Nonferrous Metals: Cataloy.

S12 Scovill Mfg. Co., Waterbury, Conn.

Copper Alloys: Adnic, Alcunic, Scovill, Spring Oreide.

Nickel Silver: Scovill.

S14 Seitzingers, T. F., & Sons, 900 Ashby N. W., Atlanta, Ga.

Babbitt Metal for Bearings: AAAA.

S16 Seneca Wire & Mfg. Co., Fostoria, O.

Iron, Steel and Alloy Wire: Seneca.

S18—Seymour Mfg. Co., Seymour, Conn.

Nickel Silver: Seymour, Seymourco.

S20 Sharon Steel Corp., Sharon, Pa.

Corrosion and Heat Resisting Alloys: Sharon Stainless (Types 12, 17, 17-7, 18-8, 21, 27).

S22 Sheet Aluminum Corp., Jackson, Mich.

Aluminum Alloys: Hyb-lum.

S24 Simonds Saw & Steel Co., Lockport, N. Y.

Carbon Tool Steels: Blue Label Extra, Diamond "S", Red Label.

High Speed Tool Steels: Red Streak, Super Cobalt.

Nondeforming Tool Steels: O.H.D., Teenax.

Magnet Steels: Alnico, Chrome, Cobalt, Tungsten.

Special Steels: Heat Resisting Alloys, Hi Nickel Alloys.

S26 Simpson Bros., Portsmouth, O.

Alloy Cast Irons: Paulite, Tufaloy.

S28 Sivyer Steel Casting Co., 1675 S. 43rd St., Milwaukee.

Corrosion and Heat Resisting Cast Steel: Sivyer (Types 60, 62, 64, 66, 67, 70).

Alloy Cast Steels: Diamond (Types S-1 and T), Miraculoy, Sivyer (Types Chrome Nickel Electric, Chromium Electric, Dynamo, High Carbon Electric, High Silicon, Mangane Carbon Electric, Nitro, Nuloy, Pole, Vanadium Electric).

S30 Smith Steel Foundry Co., 1320 S. First St., Milwaukee.

Alloy Cast Steel: C.N.M., Dynamo, High Chrome-Nickel, Low Chrome-Nickel.

S32 Sowers Mfg. Co. Inc., 1300 Niagara St., Buffalo.

Corrosion Resisting Cast Iron: Dopploy.

S34 Standard Alloy Co. Inc., 1679 Collamer Rd., Cleveland.

Corrosion and Heat Resisting Alloys: Standard-Alloy AR1, Standard-Alloy HR (Types Nos. 1, 2, 3, 4, 5, 5M, 6, 6M, 7, 8, 9, 10, 11).

S36 Stanley Works, New Britain, Conn.

Corrosion and Heat Resisting Alloys: Stanley (Grade A [Type 410], Grade B [Type 430], Grade C [Type 442], Grade D [Type 302]).

S38 Stedman's Foundry & Machine Works, Aurora, Ind.

Abrasion Resisting Cast Iron: Stedmetal.

S40 Steel Sales Corp., 129 Jefferson St., Chicago.

High Speed Tool Steel Welding Electrodes: Dieweld, Superweld.

S42 Steel & Tubes Inc., 224 E. 131st St., Cleveland.

Welded Steel Mechanical Tubing: Electrunite.

Welded Steel Boiler and Pressure Tubing: Electrunite.

Welded Stainless Steel Tubing: Electrunite Enduro.

Welded Steel Electrical Conduit: Electrunite Steeltubes.

S44 Stewart Die Casting Corp., 4535 W. Fullerton Ave., Chicago.

Aluminum Casting Alloys: Stewart

Lumite.

Copper Casting Alloys: Stewart White Brass.

S46 Stoody Co., Whittier, Calif.

Hard Facing Metals: Borium Inserts, Borod, Stoodite, Stoodite "45", Stoodite "54", Stoodite "63", Stoody Self-Hardening, Silfram, Tube Borium.

S48 Stroh Process Steel Co., 32nd & A. V. R. R., Pittsburgh.

Wear and Shock Resisting Cast Steel: Stroh.

S50 Studebaker Chemical Co., Elyria, O.

Bearing Metal: Bearingoy.

S52 Stulz-Sickles Co., 140 Lafayette St., Newark, N. J.

Carbon Tool Steel: Seaco.

Special Alloy Tool Steels: Seaco (Types Chrome Vanadium, Hot Die).

Nondeforming Tool Steel: Seaco Non-Shrinkable.

11 to 13½% Nickel Manganese Steel: Manganal (patented).

Ferrous Welding Rods: Manganal.

S54 Sumet Corp., 1543 Filmore Ave., Buffalo.

Bearing Bronzes: Sumet.

S56 Superior Sheet Steel Co., Canton, O.

Sheets: Superior (Types Galvanized, Galvannealed, Long Terne, Super Metal).

S58 Superior Steel Corp., 3112 Grant Bldg., Pittsburgh.

Stainless Steels: Superior.

S60 Supersteels Inc., 7209 Platt Ave., Cleveland.

Case Hardening Steel: Supercase.

S62 Swedish-American Steel Corp., 433 Kent Ave., Brooklyn, N. Y.

Carbon Tool Steels: Fagersta, White Label, Yellow Label.

High Speed Tool Steel: Brilliant.

Nondeforming Tool Steel: Non-Pa-Reil.

Drill Steel: Borite.

Chisel Steel: Borite, Duredge Alloy.

Swedish Hand Puddled Wrought Iron: Normanna.

S64 Swedish Iron & Steel Corp., 17 Battery Pl., New York.

Carbon Tool Steels: Acorn (Types Brand No. 1, Extra No. 2, Standard No. 3), Sisco.

Special Alloy Tool Steels: Fedol Oil Hardening, Sisco (Types C.N.V., C.V.R., C.V.S., V.A.S.).

High Speed Tool Steel: Federal High Speed.

S66 Swedish Steel Mills A. A., 405 Lexington Ave., New York.

Carbon Tool Steels: Fagersta (Types Best, Cutlery, Hollow Drill, Overcoat Axe, Pavement Breaker, Regular, Rolled Auger, Shoe Die, Solid Drill, Standard).

Special Alloy Tool Steels: Fagersta (Types "30" Alloy Drill, Alloy Chisel, Alloy Shoe Die, Broach, Circular Saw, Cold Header, Engraver Plates, Fast Finishing, Hot Die), Polhem Wire Drawing, Rema Hobbing Die.

Nondeforming Tool Steels: Fagersta (Types High Production, Nondeforming).

S68 Symington-Gould Corp., Rochester, N. Y.

Corrosion and Heat Resisting Alloys: Genesee (Types 212, 255, 280, 303, 315, 405, 412, 460, Ni-Hard, Ni-Resist, KA-2).

—T—

T2 Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

Corrosion and Heat Resisting Alloys: Tisco (Types 101, 101A, 102, 102A, 103, 103A, 104, 104A, 105, 105A, 106, 106A, 107, 108, 109, 110, 130, 131, 132, 150, 160).

Alloy Cast Steel: Timang, Tisco 12% Manganese.

Magnetic Alloy: Alnico.

T4 Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

Carbon Tool Steel: Tennessee Special.

Carbon Drill Steel: Tennessee Special.

High Strength Low Alloy Steels: USS (Types Cor-Ten, Man-Ten, Sil-Ten).

T6 Thompson Products Inc., 2196 Clarkwood Rd., Cleveland.

Alloy Cast Iron: Durachrome.

T8 Timken Steel & Tube Division, Timken Roller Bearing Co., Canton, O.

Corrosion and Heat Resisting Alloys: Timken (Types 12Cr, 18Cr, 18-8, 18-8S, 4-6-Cr Mo).

Creep Resisting Alloy Steels: DM Steel, Sicromo Steels.

Free Machining Die Steel: Graph-mo, Graph-sil.

T10 Titan Metal Mfg. Co., Bellfonte, Pa.

Copper Alloys: Hecla, Hitensiloy, Logan, Nittany, Penn, Tinicosil, Titan.

T12 Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

Ferroalloys: TAM.

Titanium Alloying Element for Aluminum: TAM Webbite.

T14 Titusville Forge Co., Titusville, Pa.

Alloy Crankshaft Steel: Ticrank.

Alloy Die Block Steels: Tibon, Tifco, Tiloy, Titam.

Alloy Oil Well Tool Steel: Tivan.

T16 Trenite Corp., 1501 New Willow St., Trenton, N. J.

Corrosion, Heat and Wear Resisting Alloys: Trenite (Types H, P, WX).

T18 Tri-Lok Co., 5555 Butler St., Pittsburgh.

Steel Grating and Treads: Tri-Lok.

T20 True Alloys Inc., 1820 Clay Ave., Detroit.

Bearing Bronzes: Trualoy.

Aluminum Bronzes: Trualoy.

Copper Alloy for Electrodes: Trualoy.

—U—

U2 Uddeholm Co. of America Inc., 155 E. 44th St., New York.

Carbon Tool Steels: Triangle X Special, UB Double Bolt Hollow Drill, UHB Cold Heading, UHB Regular.

Special Alloy Tool Steels: UB Double Bolt Alloy Hollow Drill, UHB (Types Fingal (Cr-W-Mo) Chisel Steel, Regin (Cr-W) Hot Work Steel, Valand (Cr-Ni-W) Hot Work Steel.

Nondeforming Tool Steels: Tri-Mo Air Hardening, UHB-46 Oil Hardening.

Corrosion and Heat Resisting Alloys: UHB Stainless (Types Nos. 11, 12, 14, 15).

U4 Una Welding Inc., 1615 Collamer Rd., Cleveland.

Ferrous Welding Rods: Una.

Nonferrous Welding Rods: Una.

U6 Union Bronze Co., Reading, Pa.

Babbitt Metal for Bearings: Velvet.

U8 Union Drawn Steel Co., Massillon, O.

Cold Drawn Steels: Union (Types Free Cut Bessemer, Hymo Steel, Precision Shafting, Special Finish, Supercut Screw Steel), Enduro Stainless Steels.

U10 Union Steel Castings Division, Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh.

Alloy Cast Steel: Univan.

U12 United American Metals Corp., 200 Diamond St., Brooklyn, N. Y.

Bearing Bronze: Autocrat.

Babbitt Metals for Bearings: American Marine, Beaver, Master Metal, Stonewall, Syracuse.

U14 United States Aluminum Co., Gulf Bldg., Pittsburgh.

Aluminum Casting Alloys: Alumac.

U16 United States Graphite Co., Saginaw, Mich.

Bearing Bronze: Gramix.

U18 United States Pipe & Foundry Co., Burlington, N. J.

Centrifugally Cast Iron: Super deLavaud Metal.

U20 United States Reduction Co., East Chicago, Ind.

Aluminum Alloys: USCO.

Babbitt Metal: Advance.

U22 United States Steel Corp., Carnegie-Illinois Bldg., Pittsburgh.

See listings under subsidiary companies.

U24 Universal-Cyclops Steel Corp., Bridgeville, Pa.

Carbon Tool Steels: Cyclops (Types Cyclo, Extra, Special, Standard).

Special Alloy Tool Steels: Ajax Alco, Apollo, Draco (Types Cyclo, Extra, Special, Standard), Hercules, K, No. 67, Orion, Para, Rajah, Saturn, Thermold, Titus, Venango.

High Speed Tool Steels: B-4, B-6, B-7, B-8, B-9, B-44, MoTung, MoVan, Super MoTung.

Nondeforming Tool Steels: Ultradie (Types No. 1 and No. 2), Wando.

Corrosion and Heat Resisting Alloys: Cyclops (Types K Rustless Steel, No. 17-A, No. 17-B Metal), Uniloy (Types 18-8, 18-8S, 21-12, 24-11, 1409, 1435 Grade A Stainless, 1809, 1860 Grade B Stainless, 2825, 1409 M Free Machining Grade, 18-8M Free Machining Grade).

—V—

V2 Vanadium-Alloys Steel Co., Latrobe, Pa.

Carbon Tool Steels: Colonial No. 14, Ideal, Latrobe, Red Star (Types Die, Tap, Tool).

Carbon Vanadium Tool Steels: Colonial No. 7, Elvandi, Red Star Vanadium, Vasco Special.

Special Alloy Tool Steels: Choice, Colonial (Types No. 3 and No. 6), Crocar, Extrude Die, Hotform, Marvel, Non-Shrinkable, Ohio Air Die, Red Star Tungsten.

Vasco Vanadium Types: D, G, H, K, N, BB, CM, Beaver Die, Colhed, Colona Die, Croman, Nikro Trimmer, Par-Exc, Silman, Tungo.

Nondeforming Tool Steels: Colonial 6, Crocar, Ohio Air Die, Non-Shrinkable, Red Star Tungsten.

High Speed Tool Steels: E.V.M., Gray Cut Cobalt, Red Cut (Types Cobalt and Superior).

Corrosion and Heat Resisting Alloys: Stainless (Types A, B, C-2, C-2F, F.M.S., I, N, U, 410, 410F, 610, 610F, 795).

Abrasion Resisting Steel: Macalloy.

High Strength Alloy Steels: Beaver Die, Colona Die, Nikro Trimmer, Vanadium (Types D and G).

Nitriding Steel: Nitralloy.

V4 Vanadium Corp. of America, 420 Lexington Ave., New York.

Ferroalloys: Alsifer, Vancoram.

V6 Vascoloy-Ramet Division, Vanadium-Alloys Steel Co., North Chicago, Ill.

Cemented Carbides: Vascoloy-Ramet (Grades A, AAA, AR, AT, AW, B, D, DT, DW, E, EE, EM, M, SS, X, XX).

V8 Vulcan Crucible Steel Co., Aliquippa, Pa.

Carbon Tool Steels: Extra, Fort Pitt, Special.

Special Alloy Tool Steels: A-41, A-42, Calo Ferro, Extra Chrome, Hecla, Hi-Pro, KR, Non-Hardening, Regal No. 2, Special Van.

High Speed Tool Steels: Super Steel, Vul-Mo, Wolfram High Speed.

Nondeforming Tool Steel: Hardrite Non-Shrinkable.

Corrosion Resisting Alloy: Stainless Steel Type A.

V10 Vulcan Foundry Co., 4401 San Leandro St., Oakland, Calif.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

—W—

W2 Walworth Co., Statler Bldg., Boston.

Corrosion and Heat Resisting Alloys: 18-18, KA-2S, Ni-Resist.

W4 Ward's, Edgar T., Sons Co., P. O. Box 1557, Pittsburgh.

Carbon Tool Steels: Centaur, Chippaway, Domestic, Lion, Utilitas, Washington.

Special Alloy Tool Steels: 2 B Hot Die, High Carbon Alloy, Hot Stamping Alloy Die, JJ Hot Work, Shock Resisting, Special Alloy, Special Oil Hardening, Top Notch, Zip-Zip Chisel.

High Speed Tool Steels: Jessco, Purple Label, Special, Supremus, Supremus Extra.

Nondeforming Tool Steels: 3-C Die, Truform, Truform Special.

W6 Warman Steel Casting Co., 6100 S. Boyle Ave., Los Angeles, Calif.

Corrosion and Heat Resisting Cast Steel: Warman Calmar (Types 18-8, 18-8 Cb, 18-8, Mo, 18-8 Ti), Warman Caloxo (Types 17, 25, 25-20, 28-10, 35-15), Warman Chrome (Types 6, 12), Warman Chrome Nickel 13-2, Warman Chromoly 650.

Nitrided Cast Steel: Nitralloy.

W8 Warren Foundry & Pipe Corp., Phillipsburg, N. J.

Corrosion, Heat and Wear Resisting Gray Iron: Meehanite.

W10 Washburn Wire Co., Phillipsdale, R. I.

Steel Wire: Eagle Music Wire.

W12 Washington Iron Works, 1500 Sixth Ave., Seattle.

High Strength Alloy Steel: Superloy.

W14 Waukesha Foundry Co., Waukesha, Wis.

Nickel Alloys: Waukesha Metal.

W16 Weatherly Foundry & Mfg. Co., Weatherly, Pa.

Abrasion Resisting Cast Iron: Diamite, Moly-Iron.

W18 Webb Wire Works, New Brunswick, N. J.

Corrosion and Heat Resisting Alloys: Ship Brand (Types Blue Label, Orange Label, Red Label).

W20 Wehr Steel Co., 5234 W. Mobile St., Milwaukee.

Corrosion and Heat Resisting Alloys: Wehralloy (Types Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 21, 22, 23, 24, 26, 27, 28, 29, 31, 43, Stainless 18-8, Stainless 18-8 Special).

W22 Weirton Steel Co., Weirton, W. Va.

Cold Process Tin Mill Products: Weirite.

W24 Welding Sales & Engineering Co., 1627 W. Fort St., Detroit.

High Conductivity Copper Alloy: Trodaloy.

W26 Wellman Bronze & Aluminum Co., 6017 Superior Ave., Cleveland.

Copper-Tin-Zinc-Lead Alloys: Ampco, Anfriloy, Idealoy, Welcast.

W28 West Steel Casting Co., 805 E. 70th St., Cleveland.

Alloy Cast Steels: Duralloy, West (Types Nos. 2, 3, 3A, 4, 4A, 5, 6, 9, 9A, 10), West Cumloy (Types Nos. 11, 12, 13, 14, 14A), West Duracast (Types Nos. 7, 7A, 8), West Hycast No. 6A, West Stancast No. 1).

W30 Western Alloyed Steel Casting Co., 2833 Grand Ave., Minneapolis.

Alloy Cast Steel: Westeeco (Types No. 5, No. 35-15).

W32 Western Cartridge Co., East Alton, Ill.

Copper Alloy: Luballoy.

W34 Western Electric Co., S. Cicero & Cermak Rd., Chicago.

Magnetic Alloys: 45 Permalloy, 78 Permalloy, Chromium Permalloy, Molybdenum Permalloy, 50-50 Permendur, Vanadium Perminvar, 24-45 Perminvar, 7.5-70 Perminvar.

W36 Westinghouse Air Brake Co., Wilmerding, Pa.

Alloy Cast Iron: WAB Alloys, Wabcoloy.

W38 Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Corrosion and Heat Resisting Alloys: Konel, Phos-Copper.

Magnetic Alloy: Hipernik.

Alloy with Low Coefficient of Expansion: Kovar.

Copper Base Alloy: Cupaloy.

W40 Wetherell Bros. Co., 251 Albany St., Cambridge, Mass.

Carbon Tool Steels: Best Warranted, Labelle-Eagle, Special.

Special Alloy Tool Steels: Airdie, Cold Striking Die, Header Die, No. 24.

Corrosion and Heat Resisting Steels: K. E. (Types 241, 954, 965, 2258).

W42 Wheeling Steel Corp., Wheeling, W. Va.

Copper-Alloyed Steel: Cop-R-Loy.

Cold Reduced Tin Plate: Ductillite.

Normalized Tin Plate: Wheeling Coke Tin Plate.

W44 Wheelock, Lovejoy & Co. Inc., 128 Sidney St., Cambridge, Mass.

Carbon, Special Alloy and High Speed Tool Steels: Whelco.

Machinery Steels: Economo (Grades No. 20, No. 50).

Special Analysis Steels: Hy-Ten (Grades A No. 1, B No. 2, B No. 3X, B No. 5, "M").

W46 Wickwire Spencer Steel Co., 41 E. 42nd St., New York.

Corrosion and Heat Resisting Alloys: Wissco Stainless (Types No. 1, 1M, 2, 3, 4, 4M, 4S, 5A, 5CN).

Steel Wire and Welding Wire: Wissco.

W48 Wilcox-Rich Division, Eaton Mfg. Co., 9771 French Rd., Detroit.

Abrasion Resisting Alloy: Xaloy.

W50 Williams, E. A., & Son Inc., 111 Plymouth St., Jersey City, N. J.

Babbitt Metals and Bearing Bronzes: Ampco Bronze, Clover Leaf, Diamond G Bronze, Mill Brass Mix.

W52 Wilson, H. A. Co., 97 Chestnut St., Newark, N. J.

Special Electrical Alloy: Aeralloy.

Thermostatic Bimetal: Wilco Thermometal.

Cemented Tungsten Carbide: Wilcoloy.

W54 Wilson Welder & Metals Co., 60 E. 42nd St., New York.

Ferrous and Nonferrous Welding Rods: Airco, Wilson.

W56 Wing, J. T., & Co., 300 Bates St., Detroit.

Babbitt Metal for Bearings: Nic-Motal.

W58 Wonham Inc., 44 Whitehall, New York

Copper Alloy: Tungum Alloy.

W62 Worth Steel Co., Claymont, Del.

Steel Plates: Worth.

W64 Worthington Pump & Machinery Corp., Harrison, N. J.

Alloy Cast Iron: Wompco.

Corrosion and Heat Resisting Cast Steel: Worthite.

W66 Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh.

Cold Finished Steels: Wyco.

Cold Finished Alloys: Wyco.

—Y—

Y2 Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown, O.

High Strength Alloy Steel: Yoloy.

Normalized Tin Plate: Youngstown Pliaduc.

Cold Reduced Tin Plate: Youngstown Cold Reduced.

Rust Resisting Steel: Copperoid.

—Z—

Z2 Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago.

Carbon Tool Steels: Hollow Drill, Rolled Auger, Solid Drill, Zivco, Ziv's.

Special Alloy Tool Steels: Do-It, Lophos, Plancher, VanDieCar, Wizard.

High Speed Tool Steels: BRM, Cobalt, Red Shadow, Super Zip.

Nondeforming Tool Steels: Hargus, Neor, Normar, PRK 33.

Tantalum Carbide: Straus Metal.

Z4 Zurbach, L. E. Steel Co., 130 Sixth St., Cambridge, Mass.

Sheet and Strip Steel: Zurco (Types Grade A, Grade B, Galvacote, Silvatex, Stainless).

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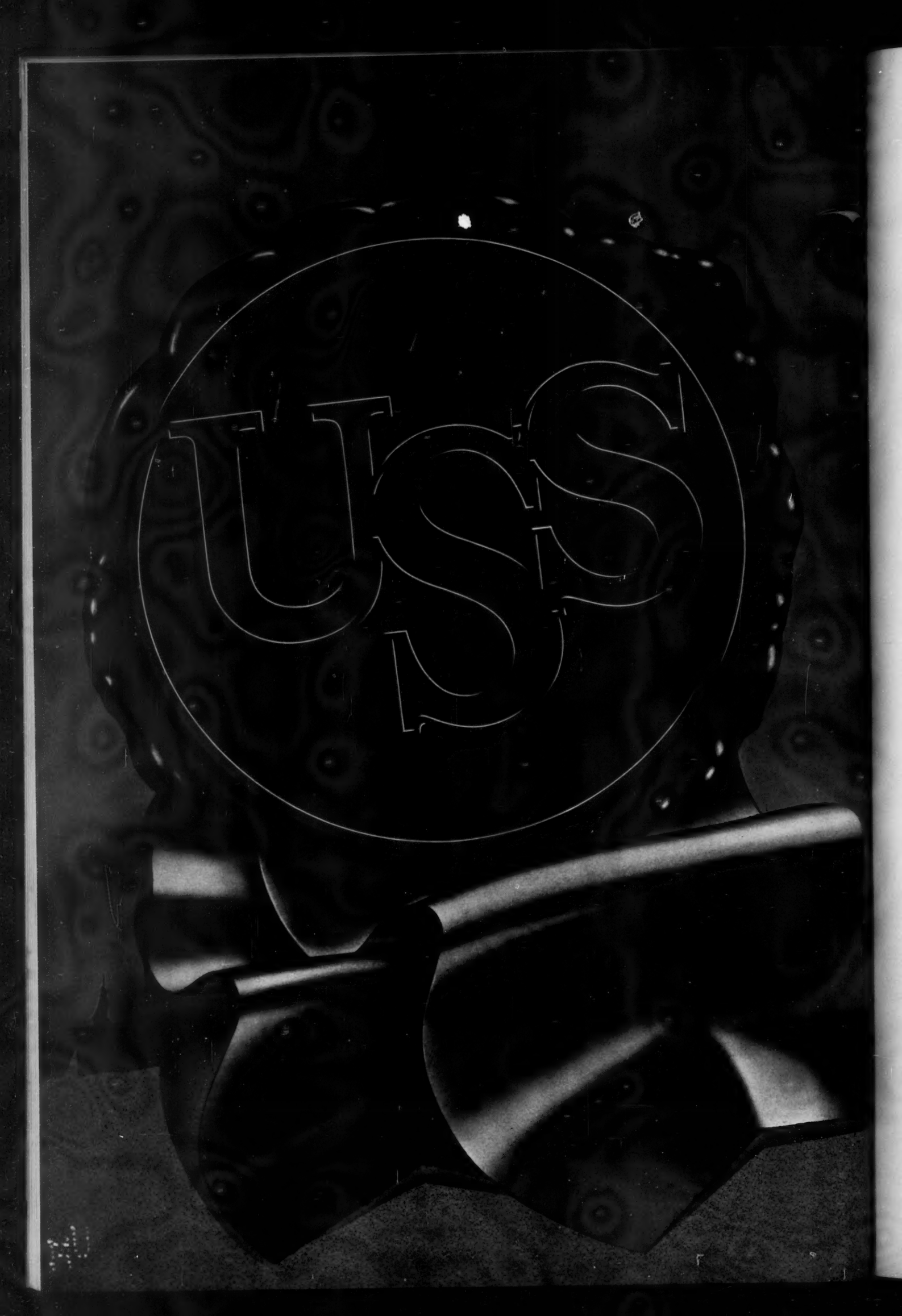
■ **To the many manufacturers, distributors and agents who have assisted in compiling and checking the listings presented in this Directory, STEEL makes grateful acknowledgement.**


USS

Industrial Equipment of Past Year Features Production Speed, Safety And Economy of Operation

■ ALTHOUGH quality of the work which machines or tools will produce has always been emphasized by manufacturers of industrial equipment, the year 1937 has seen other favorable points stressed.

Speed of production, economy of operation and minimizing of waste or rejects have been important advantages of equipment announced within the past 12 months. Safety, too, has been a salient feature of many of the new products and considerable time has been spent designing equipment with convenience and comfort to the worker in mind.

The many refinements and developments in industrial machines, equipment and accessories have been too numerous to mention here, but noticeable advances have been made in welding machinery, presses of increased speed and capacity, sensitive electric controls, highly efficient unit heaters, diesel engines and many other lines.

Throughout the past year, the New Equipment section has been a weekly feature of STEEL and in its pages have been presented details of the new or improved products of the nation's builders of manufacturing equipment and accessories.

Below are listed these valuable contributions to manufacturing efficiency. Some 350 manufacturers are represented and nearly 1000 of the products introduced by them in the last 12 months. Each item contains the company name and address, followed by the date of the issue of STEEL in which each item appeared and, in most cases, was illustrated. A perusal of this listing readily indicates the unusual activity of American equipment builders during the year.

A

Acme Electric Welder Co., 5623 Pacific boulevard, Huntington Park, Calif.: 3/1—roll welder; 4/19—welding attachment.

Acme Mfg. Co., Detroit: 3/8—tube polishing machine.

Acme Steel Co., Chicago: 3/22—shear.

Agnew Electric Co., Milford, Mich.: 3/29—spot welder.

Air Reduction Sales Co., 60 East Forty-second street, New York: 10/11—gas welding rod.

Ajax Mfg. Co., Euclid, O.: 2/8—bolt heading machine.

Aldon Products Co., Duncannon, Pa.: 5/31—valve grinder.

All-Steel-Equip Co., Aurora, Ill.: 8/16—group locker.

All Steel Welded Truck Corp., Rockford, Ill.: 6/7—scrap truck; 6/28—tote pan truck.

Allis-Chalmers Mfg. Co., Milwaukee: 2/8—voltage regulator; 5/24—material feeder; 6/21—air motor-starter; 9/20—reversing motor starter; 12/6—multi-stage pump.

Allsteel Press Co., Chicago: 4/5—press brake; 5/3—eccentric type press.

American Broach & Machine Co., Ann Arbor, Mich.: 7/12—broaching machine; 10/27—hydraulic broaching machine.

American Car & Foundry Co., 30 Church street, New York: 10/11—electric heaters.

American District Steam Co., North Tonawanda, N. Y.: 2/8—tile conduit.

American Floor Surfacing Machine Co., Toledo, O.: 6/21—belt sander.

American Foundry Equipment Co., 555 Byrkit street, Mishawaka, Ind.: 6/7—sand cutter; 6/28—casting cleaner; 10/18—blast cleaner.

American Gas Furnace Co., Elizabeth, N. J.: 7/26—rotary carburizer; 9/6—flow meters.

American Manganese Steel Co., Chicago Heights, Ill.: 8/2—heat treating box.

American Transformer Co., 178 Emmet street, Newark, N. J.: 1/25—voltage regulator.

Arcade Mfg. Co., Freeport, Ill.: 3/15—lift truck.

Askania Regulator Co., 1601 South Michigan avenue, Chicago; 5/10—flow meter.

Atlantic Metal Hose Co., 123 West Sixty-fourth street, New York: 12/6—metal hose.

Atlas Press Co., Kalamazoo, Mich.: 5/24—drill grinding attachment; 9/6—safety belt guards; 11/8—bench shaper.

Autocall Co., 237 Tucker avenue, Shelby, O.: 3/8—flow indicator.

Automatic Gasflux Co., Cleveland: 11/1—automatic fluxer.

Automatic Temperature Control Co., 34 East Logan street, Philadelphia: 10/11—furnace timer.

Automatic Transportation Co., 101 West Eighty-seventh street, Chicago: 4/5—industrial truck controller.

B

Bailey Meter Co., 1050 Ivanhoe road, Cleveland: 2/15—Multi-Pointer gage; 4/26—flow meter.

Baker-Raulang Co., Cleveland: 1/11—elevating trucks; 7/21—telescoping high lift truck; 11/29—ram and fork trucks.

Baldor Electric Co., 4351 Duncan avenue, St. Louis: 11/15—carbide tool grinder.

Barber-Colman Co., Rockford, Ill.: 11/1—hobbing machine.

Barkling Fuel Engineering Co., 400 North Paulina street, Chicago: 3/8—continuous furnace.

Barnes Drill Co., Rockford, Ill.: 1/11—drilling machine.

Beardsley & Piper Co., 2541 North Keeler avenue, Chicago: 6/14—sand conditioner; 8/30—gyratory screen.

Beaver Pipe Tools Inc., Warren, O.: 5/31—pipe cutoff; 11/1—pipe tool.

Billings & Spencer Co., Hartford, Conn.: 5/24—pipe vise.

Binks Mfg. Co., 3114 Carroll avenue, Chicago: 1/11—extension spray gun; 3/15—

spray finishing turntable.

Black & Decker Mfg. Co., Towson, Md.: 6/7—bench grinder; 11/22 — electric drill.

G. S. Blakeslee & Co., Nineteenth street and Fifty-second avenue, Chicago: 1/25—degreaser; 2/1—spiral quencher.

E. W. Bliss Co., 1420 Hastings street, Toledo, O.: 1/11—double seamer; 5/17—double crank press; 9/6 — toggle drawing press.

Bonney Forge & Tool Works, Allentown, Pa.: 1/11—socket sets; 6/28 — Phillips screwdriver.

Borm Mfg. Co., Elgin, Ill.: 12/13 — triggerless pneumatic hammer.

Boston Gear Works, North Quincy, Mass.: 1/18—flexible couplings.

Bristol Co., Waterbury, Conn.: 2/15—electric flow meters; 6/7 — temperature anticipator; 6/28—portable pyrometer; 8/9 — pyrometer controller; 10/11 — temperature recorder; 11/8 — potentiometer pyrometer.

Brown & Sharpe Mfg. Co., Providence, R. I.: 2/8—vertical spindle milling machine; 5/10—milling machines; 8/9—plain grinding machine; 11/22—magnetic chuck.

Charles Bruning Co., 102 Reade street, New York: 5/10—printer.

Bucyrus-Erie Co., South Milwaukee, Wis.: 1/11—bulldozer; 2/1—excavator.

Bull Dog Electric Products Co., 7610 Josef Campau avenue, Detroit: 9/6—electrical system.

Bump Pump Co., La Crosse, Wis.: 11/15—pump units.

Jabez Burns & Sons Inc., Eleventh avenue and Forty-third street, New York: 4/19—dust collector.

C

Andrew C. Campbell division, American Chain & Cable Co., Bridgeport, Conn.: 5/31—abrasive cutter.

J. A. Campbell Co., Box 851, Long Beach, Calif.: 5/31—water level control.

Carboloy Co., 2985 East Jefferson avenue, Detroit; 1/25—tool kit.

Caterpillar Tractor Co., Peoria, Ill.: 8/23—blade grader.

Chambersburg Engineering Co., Chambersburg, Pa.: 1/25 — pneumatic hammer; 2/22—trimming press; 3/15—bearing load calibrator; 6/21—boiler spud press.

Chelsea Fan & Blower Co., 370 West Fifteenth street, New York: 4/19 — disk grinder.

Chicago Dial Indicator Co., 180 North Wacker drive, Chicago: 7/12—dial indicator.

Chicago Eye Shield Co., 2300 Warren boulevard, Chicago: 3/29—respirator.

Cimatool Co., Dayton, O.: 3/29—gear chamfering machine; 10/4—gear burnisher.

Cincinnati Electrical Tool Co., Cincinnati: 8/2—cut-off machine; 9/20—disk grinder.

Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York: 2/8—grinder; 7/19—diesel engines.

James Clark Jr. Electric Co., Louisville, Ky.: 1/18—hand drill; 11/1—grinder; 12/13—grinder.

Clayton & Lambert Mfg. Co., French road at Madola, Detroit: 8/9—midget flame torch.

Cochrane-Bly Co., Rochester, N. Y.: 6/7—metal sawing machine; 6/28—metal sawing machine.

Cleveland Punch & Shear Works Co., 3917 St. Clair avenue, Cleveland: 5/3 — power press.

Cleveland Universal Jig Co., 13404 St. Clair avenue, Cleveland: 4/19—jig boring machine.

Cochran-Bly Co., St. James street, Rochester, N. Y.: 2/8—milling machine; 3/15—hydraulic saw.

Colonial Broach Co., Detroit: 5/10—broaching machine.

Connecticut Broach & Machine Co., New London, Conn.: 3/1—broaches.

Continental Machine Specialties Inc., 1301 Washington avenue, South, Minneapolis: 3/15—contour machine; 6/28—machine tool; 11/1—contour machine.

Covel Manufacturing Co., Benton Harbor, Mich.: 4/19—surface grinder; 7/19 — surface grinder.

Crane Co., 836 South Michigan avenue, Chicago: 11/1 — forged steel unions.

Crane Packing Co., 1800 Cuyler avenue, Chicago: 2/15—plastic packing.

Cutler-Hammer Inc., 320 North Twelfth street, Milwaukee: 3/8—drum controller.

D

Davey Compressor Co., Kent, O.: 6/14—power take-off.

Davis-Franco, 6619 West Mitchell street, Milwaukee: 4/26—injector pump.

Day-Brite Reflector Co., 5401 Bulwer avenue, St. Louis: 4/19—industrial reflector.

DecoVator Scaffolding Corp., 2988 East Grand boulevard, Detroit: 6/28 — mechanical scaffold.

Defiance Machine Works, Defiance, O.: 2/15 — boring machine.

DeLaval Steam Turbine Co., Trenton, N. J.: 5/10—motor mounted pumps.

Delta Mfg. Co., 600 East Vienna avenue, Milwaukee: 4/26—belt surfacer; 5/3—drill press.

Delta-Star Electric Co., 2400 Fulton street, Chicago: 4/19—metal clad switchgear; 6/14 — heavy capacity switch; 6/21—bus support; 7/5 — heavy-duty switch; 7/26 — cable terminators; 8/30 — neavy-duty switch; 11/1 — oil-blast circuit-breaker.

Detroit Rex Products Co., 13005 Hillview avenue, Detroit: 10/11—degreaser.

DeVilbiss Co., Toledo, O.: 4/12—fluid circulating pump; 7/12—air compressors; 12/6—air motor drive.

Harry W. Dietert Co., 9330 Roselawn avenue, Detroit: 3/15—clay washer.

Divine Bros. Co., Utica, N. Y.: 1/11—truck casters.

Donaldson Co., 666 Pelham street, St. Paul: 6/7—air cleaners.

Dongan Electric Mfg. Co., Detroit: 2/1—arc welder.

H. S. Dover, South Bend, Ind.: 6/28—gas-tight goggles.

Dravo Corp., Pittsburgh: 3/15—concrete bucket.

Duff-Norton Mfg. Co., Pittsburgh: 8/16—pipe jack.

Dumore Co., Racine, Wis.: 3/22—hand grinder; 4/5—grinder quills; 6/21 — fractional horsepower motors; 9/13—lathe grinder.

E

Eastern Machine Screw Corp., Truman and Barclay streets, New Haven, Conn.: 4/12—feed fingers.

Easton Car & Construction Co., Easton, Pa.: 3/29 — movable truck floor.

Eclipse Air Brush Co., 79 Orange street, Newark, N. J.: 7/5—spray hose.

Thomas A. Edison Inc., Orange, N. J.: 12/6—fire detector.

Eisler Engineering Co., 740 South Thirteenth street, Newark, N. J.: 8/9—spot welder; 10/25—spot welder; 12/20—welders.

Electric Air Heater Co. division, American Foundry Equipment Co., 555 South Byrkit street, Mishawaka, Ind.: 6/14 — industrial heater.

Electric Controller & Mfg. Co., 2700 East Seventy-ninth street, Cleveland: 8/9 — lifting magnet controller.

Electric Heat Control Co., 9123 Inman avenue, Cleveland: 3/1—arc welder.

Electro Lift Inc., 30 Church street, New York: 1/11 — close headroom hoist.

Emerson Electric Mfg. Co., St. Louis: 3/15—fan; 5/17—fans.

Euclid Crane & Hoist Co., 1361 Chardon road, Euclid, O.: 2/1 — hydraulic hoist brakes.

Excello Corp., Detroit: 11/29—multiple boring units.

Excelsior Tool & Machine Co., East St. Louis, Ill.: 6/7 — stainless steel polisher.

F

Fafnir Bearing Co., New Britain, Conn.: 1/11 — pillow block; 4/19—ball bearings; 7/5—block bearing.

Fairbanks, Morse & Co., 900 South Wabash avenue, Chicago: 6/7—diesel engine; 10/4—generating sets; 11/1—built-together pump; 12/20—diesel-driven compressors.

Fansteel Metallurgical Corp., North Chicago, Ill.: 12/20—tool alloys.

Falk Corp., Milwaukee; 6/14—flexible couplings.

A. B. Farquhar Co., York, Pa.: 9/13—hydraulic press.

Farrel-Birmingham Co., Ansonia, Conn.: 3/22 — gear generating machine; 5/31—gear hardening machine.

Federal Machine & Welder Co., 212 Dana street, Warren, O.: 8/23—spot welders; 10/4—spot welders.

Federal-Mogul Corp., 11031 Shoemaker street, Detroit: 2/8—oil leak indicator.

Federal Press Co., Elkhart, Ind.: 1/18—inclinable press.

Federal Products Corp., 1144 Eddy street, Providence R. I.: 10/27—test indicators

Fisher Research Laboratories Sales Co., 45 Rockefeller Plaza, New York: 1/11 — locating device.

Flexible Steel Lacing Co., Chicago: 8/16—V-belt fasteners.

Foote Bros. Gear & Machine Corp., 5301 South Western boulevard, Chicago: 2/22—motorized speed reducer; 4/12—speed reducer.

Ford Motor Co., Johansson division, Dearborn, Mich. 4/19—gage blocks.

Forsberg Mfg. Co., Bridgeport, Conn.: 3/22—composition mallet.

Foxboro Co., Foxboro, Mass.: 10/4—recording thermometers.

G

Gairing Tool Co., Detroit: 10/18—blade and lock.

Gallmeyer & Livingston Co., Grand Rapids, Mich.: 8/23—surface grinder.

Gardner-Denver Co., Quincy, Ill.: 8/23—single-stage compressor.

Gearench Mfg. Co., 313 Hughes street, Houston, Tex.: 11/1—pipe tongs.

General Electric Co., Schenectady, N. Y.: 2/22—thermal overload switch; 3/29—rotating cam switches; 5/24—contactor; 6/7—push-button station; 6/14—cable insulation; 6/21 — push-button station; 7/5 — circuit breaker; 9/6 — illuminated push-button; 9/20—reclosing fuse cutout; 12/20—crane control.

General Electric Vapor Lamp Co., Hoboken, N. J.: 7/19—mercury lights.

General Fireproofing Co., Youngstown, O.: 2/15—pipe and bar rack.

Gisholt Machine Co., Madison, Wis.: 10/4—turret lathes.

Gleason Works, Rochester, N. Y.: 9/27—gear finishing machine.

Globe-Wernicke Co., Norwood, Cincinnati: 5/24—office furniture; 10/27—steel desks.

B. F. Goodrich Co., Akron, O.: 12/13—conveyor belt.

Gorton Heating Co., Cranford, N. J.: 6/14—air eliminator.

Greenerd Arbor Press Co., Nashua, N. H.: 2/22—hydraulic press; 9/6—hydraulic presses.

Greenfield Tap and Die Corp., Greenfield, Mass.: 3/15 — ground thread taps.

Grob Brothers, Grafton, Wis.: 3/1—filing machine; 8/2—open-end band saw.

H

Hack Machine Co., 440 North Oakley boulevard, Chicago: 8/30—die making machine.

Hagan Corp., Pittsburgh: 8/16—air-gas regulator.

Hammond Machinery Builders Inc., Kalamazoo, Mich.: 8/16—grinders.

Hanchett Mfg. Co., Big Rapids, Mich.: 3/8 — surface grinder.

Hannifin Mfg. Co., 621 South

Kolmar avenue, Chicago: 2/1—straightening press; 2/8 — portable hydraulic press; 8/23—air cylinders; 9/27—straightening press.

Hardinge Bros. Inc., Elmira, N. Y.: 11/15—bench lathe.

Hayward Co., 50 Church street, New York: 7/26—clam shell bucket.

Heald Machine Co., Worcester, Mass.: 12/20 — internal grinder.

W. F. Hebard & Co., 433 South Jefferson street, Chicago: 5/17—gas tractor.

James C. Heintz & Co., 3738 West 143rd street, Cleveland: 6/7—belt vulcanizer.

Henry Engineering Co., 7401 Sangamon street, Chicago: 4/19—flexible coupling.

Hexcel Radiator Co., Racine, Wis.: 8/9—electric heater.

Hisey-Wolf Machine Co., Cincinnati: 5/3 — buffing and polishing machine; 10/18—wet grinder; 11/29—precision grinder.

Holo-Krome Screw Corp., Hartford, Conn.: 10/18 — wrench set.

Howe Scale Co., Rutland, Vt.: 12/13 — scale cut-off attachment.

Hubbard & Co., Pittsburgh: 8/16—steel insulator pin.

C. B. Hunt & Son, Salem, O.: 2/8—double solenoid valve; 9/13—hydraulic valve.

I

Ideal Commutator Dresser Co., Sycamore, Ill.: 4/19 — electric pliers.

Independent Pneumatic Tool Co., Aurora, Ill.: 11/15 — right angle drill.

Index Machinery Corp., 49 Central avenue, Cincinnati: 8/23—injection molding machine.

Industrial Brownhoist Corp., 4403 St. Clair avenue, Cleveland: 1/11 — locomotive crane.

Industrial Gas Engineering Co., 201 East Ohio street, Chicago: 5/31 — high temperature exhausters.

Industrial Instrument Co., 96 East Miller avenue, Akron, O: 11/22 — pressure controller.

Ingersoll Milling Machine Co., Rockford, Ill.: 1/11 — ray blade core drills.

Ingersoll-Rand Co., Phillipsburg, N. J.: 2/8 — motor-blower; 6/21—air compressors.

J

Jackson Electrode Holder Co., 6553 Woodward avenue, Detroit: 8/30—electrode holder.

Jefferson Electric Co., Bellwood, Ill.: 1/11—temperature controls.

Jeffrey Mfg. Co., Columbus, O.: 3/1 — conveyor screw takeup; 5/10 — precision weighing machine; 7/5 — coal crusher.

Johns-Manville, 22 East Fortieth street, New York: 2/22—insulating brick.

Jones & Lamson Machine Co., Springfield, Vt.: 10/4 — thread grinding machine.

K

Kane & Roach Inc., Syracuse, N. Y.: 8/16—bending roll; 9/6—bending roll.

Kinnear Mfg. Co., Columbus, O.: 8/30—door power units.

Kling Bros. Engineering Works, 1301 North Kostner avenue, Chicago: 8/23 — grinder.

W. B. Knight Machinery Co., 3920 West Pine boulevard, St. Louis: 2/1—milling machine.

Knu-Vise Products Co., 6432 Cass avenue, Detroit: 9/27—knuckle-action vise.

Kor-Lok Co., 615 Union Trust building, Cleveland: 3/29—metal roofing.

Kyle Sales Co., Box 212 Decatur, Ill.: 6/28 — truck hoist.

L

Lammert & Mann Co., 221 North Wood street, Chicago: 4/19—gas booster.

Landis Machine Co., Waynesboro, Pa.: 1/11—Landmatic die head; 2/1—pipe threading machine; 3/1—threading machine; 3/29 — disk grinding attachment; 6/14—turning machine; 7/19 — die head; 9/27—pipe cutter; 10/11 — automatic work stop; 12/13—chaser grinders.

Landis Tool Co., Waynesboro, Pa.: 6/28—hydraulic grinders.

Langelier Mfg. Co., Providence, R. I.: 5/17—drilling machine; 7/5—drilling machine; 10/18 — threading machine; 11/8—drilling machine.

R. K. LeBlond Machine Tool Co., Cincinnati: 8/2—relieving attachment.

K. O. Lee & Son Co., Aberdeen, S. Dak.: 3/29—drill chuck.

Lepel High Frequency Laboratories Inc., 39 West Sixtieth street, New York: 12/6—induction furnace.

LeRoi Co., 1706 South Sixty-eighth street, Milwaukee: 11/1—gasoline engines.

Lewis Machine Co., 1592 East Twenty-fourth street, Cleveland: 6/7 — wire straightener and cutter.

Lewis-Shepard Co., 125 Walnut street, Watertown station, Boston: 6/14 — lift trucks.

Libert Machine Co., Green Bay, Wis.: 3/15—high speed shear.

Lincoln Electric Co., 12818 Coit road, Cleveland: 8/16—electrodes.

Lindberg Engineering Co., Chicago: 7/19 — laboratory furnace.

Linde Air Products Co., 205 East Forty-second street, New York: 1/11—regulators; 9/13—gas indicators.

Link-Belt Co., 307 North Michigan avenue, Chicago: 1/11—box car loader; 7/5—elevator bucket.

Lintern Corp., 7960 Lorain avenue, Cleveland: 4/26—stretcher lantern.

Dr. F. Loewenberg, 10 East Fortieth street, New York: 4/5—photo-electric cell.

Logansport Machine Inc., Logansport, Ind.: 10/4—centrifugal pumps.

Lovejoy Flexible Coupling Co., Chicago: 11/8—flexible coupling.

Lyon Iron Works, Greene, N. Y.: 7/26—lift truck.

M

Paul Maehler Co., 2200 West Lake street, Chicago: 2/1—laboratory oven.

Mall Tool Co., 7740 South Chicago avenue, Chicago: 2/1—rail grinder; 2/8—tri-position grinder; 5/3—flexible shaft grinder.

Manning, Maxwell & Moore Inc., Hancock Valve division, Bridgeport, Conn.: 3/8 — valves; 9/6 — control valves; 11/8—steel valve.

Martin-Decker Corp., 3431 Cherry avenue, Long Beach, Calif.: 1/18—line weight indicator.

Mathews Conveyer Co., Ellwood City, Pa.: 9/6—conveyor roller; 9/27—conveyor wheels.

Mattison Machine Works, Rockford, Ill.: 5/3—sheet grinder.

Mercoid Corp., 4213 Belmont avenue, Chicago: 9/20—explosion-proof controls.

Mercury Mfg. Co., Chicago: 5/24—roll handling truck; 9/27 — burden-carrying truck; 12/6—tractor.

Metals Coating Co. of America; 495 North Third street, Philadelphia: 10/27—metal sprayer.

Metalspray Co., 113 Llewellyn street, Los Angeles: 5/3—metal spray gun.

Metallizing Co. of America, 1351 East Seventeenth street, Los Angeles: 1/11—tool post grinder; 9/20—air compressor.

Miac Products Co., Fort Wayne, Ind.: 4/5—electric brazing pot.

Michigan Tool Co., Detroit: 1/18—gear finisher; 3/29—gear checking equipment; 7/26 — gear lapping machine.

Micro Products Co., 20 North Wacker drive, Chicago: 7/12—electric welder.

Miller & Crowningshield, Greenfield, Mass.: 3/15 — milling machine.

Millers Falls Co., Greenfield, Mass.: 3/15 — metal mitre box.

Mine Safety Appliances Co., Braddock, Thomas and Meade streets, Pittsburgh: 9/13—salt dispenser.

Mine & Smelter Supply Co., 1422 Seventeenth street, Denver: 1/25 — rock bit grinder.

Modern Machine Tool Co., Jackson, Mich.: 5/31—cutting off machine.

Moline Tool Co., Moline, Ill.: 2/1—finish boring machine.

Monitor Controller Co., Baltimore: 6/7—control station.

Morse Chain Co., Ithaca, N. Y.: 4/12—clutch.

Multi-Seal Mfg. Co., 123 North Jefferson street, Chicago: 3/22—front drive rivet.

Murphy Diesel Co., Milwaukee: 11/1—diesel engine.

N

National Acme Co., 170 East 131st street, Cleveland: 3/8—milling tool; 6/28—time devices; 8/23 — super-sensitive switches.

National Broach & Machine Co., Detroit: 7/5—gear lapping machine.

National Twist Drill & Tool Co., Detroit: 6/21—milling cutters.

Niagara Electrical Instrument Co., 1 West Genessee street, Buffalo: 1/18 — industrial analyzer.

Niagara Machine & Tool Works, 637 Northland avenue, Buffalo: 1/25 — sleeve clutch; 2/1—double seamers; 7/5—horn press.

Northwest Engineering Co., 28 East Jackson boulevard, Chicago: 3/29—power shovel; 5/10—power shovel.

Northern Equipment Co., Erie, Pa.: 10/11—boiler regulator.

Norton Co., Worcester, Mass.: 4/5—crank and cam lapping machine; 7/12—cylindrical grinder; 9/20 — universal grinding machine.

Novo Engine Co., Lansing, Mich.: 4/5—streamlined engine.

Numberall Stamp & Tool Co., Huguenot Park, Staten Island, N. Y.: 6/21—wire numbering machine.

O

Ohio Electric Mfg. Co., 5900 Maurice avenue, Cleveland: 11/29—magnet controller.

Oilgear Co., 1301 West Bruce street, Milwaukee: 12/6 — displacement pump.

Oliver Machinery Co., Grand Rapids, Mich.: 3/15—speed lathe; 6/14—spinning lathe; 10/11—surface planer.

Onsrud Machine Works, 3900 Palmer street, Chicago: 1/25—air turbine grinder; 6/14—air driven grinders.

Oster Mfg. Co., 2057 East Sixty-first place, Cleveland: 7/5 — bolt threading machine.

Owen Bucket Co., Breakwater avenue, Cleveland: 11/1—scrap iron grapple.

Ozalid Corp., 354 Fourth avenue, New York: 8/2—typewriter ribbon.

P

Paasche Airbrush Co., 1909 Diversey parkway, Chicago: 10/18 — portable airpainting unit.

Pangborn Corp., Hagerstown, Md.: 3/1—electrostatic precipitator.

Pannier Bros. Stamp Co., 207 Sandusky street, Pittsburgh: 12/6 — embossing machine.

Patterson Foundry & Machine Co., East Liverpool, O.: 7/12—kettles; 11/15—blenders.

Permochart Co., Koppers building, Pittsburgh: 5/31—recording meter chart.

Permutit Co., New York: 3/15—gas analyzer.

Phoenix Ice Machine Co., 2703 Church avenue, Cleveland: 1/25—Lester die casting machine.

Pickering Governor Co., Portland, Conn.: 2/8—governor.

Pier Equipment Mfg. Co., Milton and Cross streets, Benton Harbor, Mich.: 7/5—arc welder.

Pine-Ihrig Machine Co., Oshkosh, Wis.: 5/31—pumps.

Pioneer Engineering & Mfg. Co., 31 Melbourne avenue, Detroit: 6/21 — coolant pump; 9/13—vertical coolant pump.

Pittsburgh Brass Mfg. Co., Penn avenue at Thirty-second street, Pittsburgh: 8/16—flexible pipe joints.

Portable Lamp & Equipment Co., Pittsburgh: 9/13—rail splicer.

Porter-Cable Machine Co., Syracuse, N. Y.: 3/29—portable sander; 6/14—portable sander.

Precision Scientific Co., 1750 North Springfield avenue, Chicago: 3/15 — laboratory heater.

Procunier Safety Chuck Co., 14 South Clinton street, Chicago: 10/11 — tapping machine.

Pyrometer Instrument Co., 103 Lafayette street, New York: 10/11—pyrometer.

Q

Quigley Co., 56 West Forty-fifth street, New York: 5/31—insulating refractories.

R

Rattan Mfg. Co., New Haven, Conn.: 11/15—cable cap.

Ready-Power Co., Detroit: 2/15—portable power plant.

Reed-Prentice Corp., Worcester, Mass.: 1/25—brass die casting machine; 3/22 — molding machine; 6/28 — crankshaft lathe; 7/19 — milling machine; 10/27 — vertical miller; 11/8—molding machine.

Reeves Pulley Co., Columbus, O.: 8/30 — motor pulley; 11/8—differential unit.

Reliance Electric & Engineering Co., 1088 Ivanhoe road, Cleveland: 7/19 — motor brake.

Revolvator Co., North Bergen, N. J.: 5/31—hydraulic lift truck.

Richards-Wilcox Mfg. Co., Overway division, Aurora, Ill.: 4/12—sheet metal grab.

Robbins & Myers Inc., Springfield, O.: 10/27—Moineau pump.

Wm. V. Robinson Co., Owosso, Mich.: 4/19—polishing and buffing lathes.

Rockwood Sprinkler Co., 38 Harlow street, Worcester, Mass.: 4/19—steel union.

B. M. Root Co., York, Pa.: 11/8—disk sander.

Roura Iron Works, Detroit: 8/9—dump hopper.

S

Sabin Machine Co., 6538 Carnegie avenue, Cleveland: 11/15—hand truck.

Saginaw Stamping & Tool Co., Saginaw, Mich.: 2/1—pneumatic-tired truck.

Claude B. Schneible Co., 3951 Lawrence avenue, Chicago: 8/16—dewatering tank; 11/1—dust collector.

F. J. Schwenk, 126 Tenth street, Brooklyn, N. Y.: 12/13 — proportional oil burners.

Selas Co., Eighteenth street, Philadelphia: 12/20 — flow indicator.

William Sellers & Co., 1600 Hamilton street, Philadelphia: 12/20—miller.

Seneca Falls Machine Co., Seneca Falls, N. Y.: 4/5—lathe; 6/21—lathe overarm.

Sentry Co., Foxboro, Mass.: 11/22—furnace.

Shakeproof Lock Washer Co., 2501 North Keeler avenue, Chicago: 11/15 — thread-cutting screw.

Shakespeare Products Co., Kalamazoo, Mich.: 6/14—positive position control.

Shaw-Box Crane & Hoist Co., Muskegon, Mich.: 6/7—electric hoists.

Sheffield Gage Corp., Dayton, O.: 3/27—gaging head.

T. Shriver & Co., Hamilton street and Frankfort avenue, Harrison, N. J.: 2/8—portable filter.

F. B. Shuster Co., New Haven, Conn.: 8/23—wire cutting machine.

Signode Steel Strapping Co., 2600 North Western avenue, Chicago: 4/24 — strapping tool; 6/21—strapping tool.

Skilsaw Inc., Chicago: 3/15—slow speed drills; 5/31—disk sanders.

T. L. Smith Co., 2803 North Thirty-second street, Milwaukee: 10/11 — flexible coupling.

Smith Devices, 2245 North Twelfth street, Philadelphia: 4/19—grips.

Smith Power Transmission Co., 1213 West Third street, Cleveland: 6/14—take-up bearings.

James Campbell Smith Inc., Cleveland: 6/21—air heater.

South Bend Lathe Works, 425 East Madison street, South Bend: 2/8—workshop precision lathe; 5/24—lathe; 11/22 — adjustable drive lathes.

Speeder Machinery Corp., Cedar Rapids, Ia.: 2/15—tractor shovel.

Stackbin Corp., Providence, R. I.: 2/22—stainless steel truck; 8/2—storage racks.

Standard Machinery Co., Mystic, Conn.: 11/1—molding presses.

Stanley Electric Tool division, Stanley Works, New Britain, Conn.: 1/25—electric disk sander; 2/22—electric drill.

Stanley Rule & Level Plant, Stanley Works, New Britain, Conn.: 7/12—shop rule; 11/15 — flashlight screw driver.

Stearns Magnetic Mfg. Co., Milwaukee.: 6/28 — magnetic separator.

Steelweld Machinery Co., Cleveland: 4/5—bulldozer.

M. J. Stillman Co., 116 South Michigan avenue, Chicago: 5/17—wrist timer.

Struthers Dunn Inc., Philadelphia: 3/8 — electric counter.

Sullivan Machinery Co., Michigan City, Ind.: 6/21—industrial compressor.

Sundstrand Machine Co., Rockford, Ill.: 10/11—pump units.

Super-Speed Punch Press Corp., 55 Liberty street, New York: 8/30 — punch press.

Sunstrand Machine Tool Co., Rockford, Ill.: 1/18—milling machine; 3/29—fluid motor; 5/3—multi-spindle lathe; 6/21 — pump units; 9/13—tool grinder.

Sutton Engineering Co., Pittsburgh: 3/8—straightening machine.

Swartwout Co., 18511 Euclid avenue, Cleveland: 9/20—roof ventilator.

T

Tabor Mfg. Co., 6225 Tacony street, Philadelphia: 8/2—jar squeezer.

Taft-Pierce Co., Woonsocket, R. I.: 12/20—magnetic parallels.

C. J. Tagliabue Mfg. Co., Park and Nostrand avenues, Brooklyn, N. Y.: 6/14—recording potentiometer.

Tamms Silica Co., Chicago: 2/1—pyrometer.

Taylor-Hall Welding Corp., Worcester, Mass.: 5/17—spot welder.

Taylor Instrument Cos., Rochester, N. Y.: 8/2—lever motor; 11/1 — potentiometer controller.

Templeton, Kenly & Co., 1020 South Central avenue, Chicago: 2/1 — pull rod jack.

Thomson-Gibb Electric Welding Co., Lynn, Mass.: 1/25—bench type spot welder; 2/15—spot welding machine; 2/22 — aluminum welder; 5/3—flash welder; 5/31 — welding machine.

Thwing - Albert Instrument Co., 3339 Lancaster avenue, Philadelphia: 2/22 — portable pH meters.

Timken Roller Bearing Co., Canton, O.: 3/1—fuel injection pump.

Toledo Machine & Tool Co., Toledo, O.: 5/10—repunching press; 9/13—automatic press; 12/6—automatic press.

Toledo Scale Co., Toledo, O., 11/8—conveyor scale.

Tomkins-Johnson Co., Jackson, Mich.: 1/25—underfeed clincher.

Trane Co., La Crosse, Wis.: 1/11—unit heater; 2/1—packless valve.

Trico Fuse Mfg. Co., Milwaukee: 9/27—constant level oiler.

U

Udylite Co., Detroit: 6/21—rubber pail; 10/4—indicating papers.

Unit Heater & Cooler Co., Wausau, Wis.: 7/19—humidifier.

United Cinephone Corp., 43 Thirty-third street, Long Island City, N. Y.: 11/15—photo-electric control.

U. S. Electrical Motors Inc., Los Angeles: 2/1—remote speed control; 3/29—remote control.

USL Battery Corp., Niagara Falls, N. Y.: 7/26—storage battery.

U. S. Tool Co., Ampere, N. J.: 10/4 — power - driven straightener.

V

V & O Press Co., Hudson, N. Y.: 5/3—inclinable press.

W

Wade Instrument Co., 1663 E. 118th street, Cleveland: 5/17—sketch pad set; 7/5—sketch paper.

Wagner Electric Corp., 6391 Plymouth avenue, St. Louis: 4/19—resilient mounted motors; 7/12—fan-cooled motor.

O. S. Walker Co., Worcester, Mass.: 2/22—demagnetizer.

Wallace Supplies Mfg. Co., 1310 Diversey parkway, Chicago: 2/1 — bending machine; 3/15—bar bending machine; 10/11 — hand-operated bender; 12/20—rolling machine.

Walker-Turner Co., Plainfield, N. J.: 4/26—belt surfacer.

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.: 7/5—nut making machine; 8/23—automatic nut machine; 9/6—rivet headers; 9/27 — crank header; 12/20—drawing press.

Waukesha Motor Co., Waukesha, Wis.: 12/13—automatically controlled gas engine.

Watson-Stillman Co., Roselle, N. J.: 6/7—hydraulic press.

Weldit Acetylene Co., Detroit: 2/15—welding torch.

Westbrook Equipment Co., 1006 Greenview avenue, Garfield Heights, Cleveland: 5/31—drawing stand.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.: 2/8—ignitron seam welder; 2/15 — switchgear; 3/1 — midget contactors and line starters; 3/8—motor starter; 4/26—reflector; 6/14—fan-cooled motor; 6/21—plug-in instruments; 8/30—midget welder; 10/18—line-starters.

Wheelco Instruments Co., 1933 South Halsted street, Chicago: 10/11—proportioning control.

David White Co., 315 West Court street, Milwaukee: 9/13—level transit.

Whitney Metal Tool Co., Rockford, Ill.: 5/3—notcher.

Wickes Bros., Saginaw, Mich.: 5/10—crankshaft lathe.

J. G. Wilson Corp., 1841 Broadway, New York: 10/18—rolling grilles.

J. H. Williams & Co., 75 Spring street, New York: 9/6—wrenches.

Wilson Welder & Metals Co., 60 East Forty-second street, New York: 2/8—electrodes; 8/9—arc welders; 10/27—pipe line welder.

L. J. Wing Mfg. Co., 154 West Fourteenth street, New York: 3/22—unit heater.

Wodack Electric Tool Corp., 4627 West Huron street, Chicago: 10/11—tool retainer.

Worthington Pump & Machinery Corp., Harrison, N. J.: 6/7—boiler feed pumps; 6/21—compressor control; 9/27—dry vacuum pumps; 11/8—gas engine compressors.

Wright-Austin Co., Detroit: 5/10—water gage illuminator.

L. G. Wright Inc., 5203 Euclid avenue, Cleveland: 4/26—drafting machine.

Y

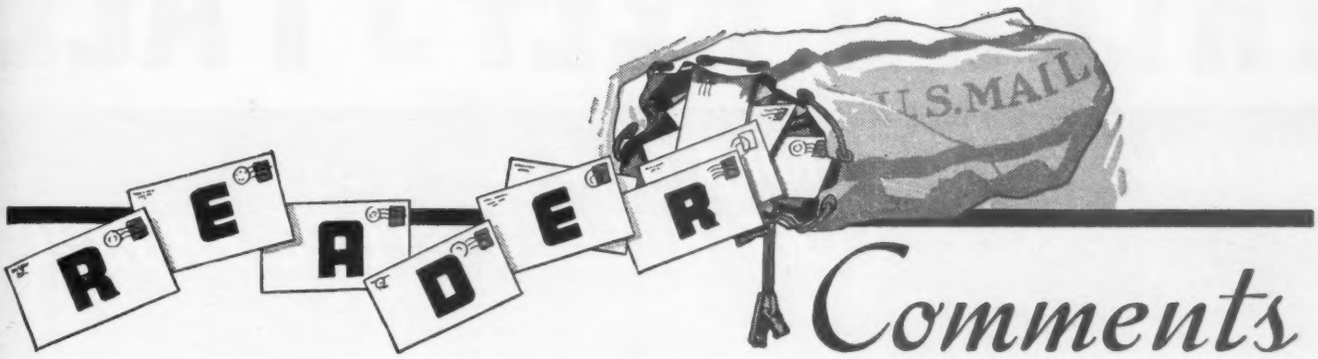
Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia: 1/25—pig metal handling truck; 2/1 — scoop truck; 9/20—ram truck.

Yawman & Erbe Mfg. Co., 1099 Jay street, Rochester, N. Y.: 8/16—steel desks.

Young Radiator Co., Racine, Wis.: 2/22—cooling unit.

Z

Zeh & Hahnemann Co., 182 Vanderpool street, Newark, N. J.: 1/25—straight side press.



Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Make STEEL More Effective

To the Editor:

We have analyzed the effect, or rather the good, that our men get from reading STEEL and it seems that by rerouting this somewhat it will be more convenient for our men and lessen the time it takes to get it through the various hands. Therefore we would like to have a new supply of routing slips with the enclosed list of names.

L. H. JUENGLING
Manager, Sheffield Steel Corp.
Kansas City, Mo.

Secrets Are "Bugbear"

To the Editor:

A suggestion which I believe should be carried through to all manufacturing industries is that the question of secrecy regarding their manufacturing processes is a bugbear.

Personally, I believe that if a competitor wants the information you have, he can get it, and you may as well lay your cards on the table to begin with and tell him just what you have been doing, and, at the same time, tell him the trouble you had in developing it and the cost involved in working out the various "bugs."

Perhaps then your competitor will not be so anxious to try to steal your "thunder." I believe that if this could be put over to the manufacturers, the cost of manufacturing generally speaking, would be lowered considerably.

This same thought in my personal opinion carries through to prices, discounts, etc. If your competitor wants to know what price you are getting for your goods, it is very easy for him to go out and ask a friend to get hold of a catalog and discount sheet, with the inference that he is in the market, and then pass them along to the party actually wanting the information.

J. R. BOOHER
Advertising Manager,
Cleveland Crane & Engineering Co.,
Wickliffe, O.

Co-operation for Profits

To the Editor:

Today America possesses the same genius and the same driving forces that created it. All that is necessary is the opportunity to resume progress. The great changes that have taken place socially and economically are but a refining process such as any product goes through before being acceptable to the public. These changes are the evolutionary process of rounding out a better industrial system. The business man wants a profit, the investor wants a profit, and most important of all the workers must have steady profitable employment. All are interested in the profit motive. It is the profit motive that puts men back to work and gets things done.

Irrespective of what is done or what is not done to relieve industry of the capital gains tax, the excessive personal tax, or what have you, the problem of profitable manufacturing and merchandising is increasing in complexity and demanding an increasing degree of talent on the part of those who would engage therein.

This struggle for profit is like a race. It is run over a measured course in a definite time. Any business, in this race to profits, can be vastly improved if its operations are budgeted and actual performance regularly compared and quantitatively measured. The real goal of business is profit and not volume. Questions of procedures, methods, equipment, organization and a host of others come up that otherwise are lost sight of or are assumed to be functioning properly. The real facts, or what appear to be the real facts, are brought out for scrutiny.

However the possession of these facts will not produce the profit, neither will they put men back to work. A motive force is required to start and perpetuate the movement —a man who leads—but back of him there are always others without whom profits would be impossible.

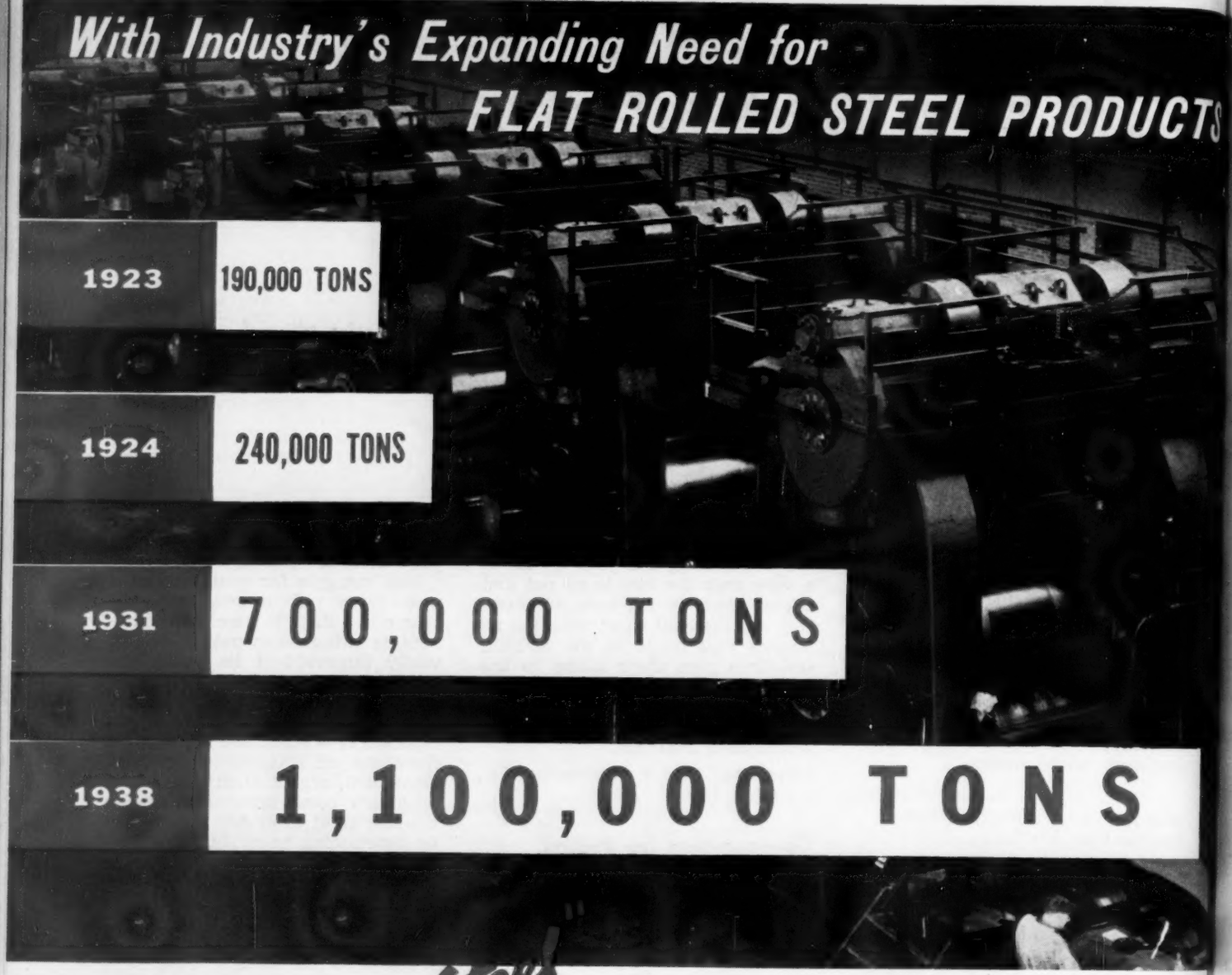
These executives will cast out traditions and fear, they will listen instead of constructing a comeback, they will rely less upon their experiences of ten years ago, and they will clip short the 30-year lag between knowing and doing.

This is the noteworthy trend in business improvement. It leads away from secrecy, it promotes co-operative modernization of plant and equipment, organization and methods, without sacrificing humaneness and efficiency.

L. E. SCRANNAGE
Superintendent,
Cleveland Hardware & Forgings Co.,
Cleveland.

INLAND KEEPS PACE

With Industry's Expanding Need for FLAT ROLLED STEEL PRODUCTS



"More Flat Rolled Steel"

This has been the persistent and insistent demand of industry in recent years. The automotive, container and household appliance industries—and countless others—have found new and constantly increased needs for sheets, strip and tin plate.

INLAND has kept pace. Its great 76" Continuous Strip Mill "blazed the trail" in 1931 . . . its facilities have been steadily improved and increased since then . . . and with the completion of the new 44" Continuous Strip Mill early in 1938, it stands ready to fulfill your requirements even better than ever before.

But INLAND has progressed not only in the expansion of its capacity for producing flat rolled steel . . . it has made noteworthy advances in achieving new high standards of quality and uniformity as well.

Reliance on INLAND for your Flat Rolled Steel will solve many a production problem for your plant.

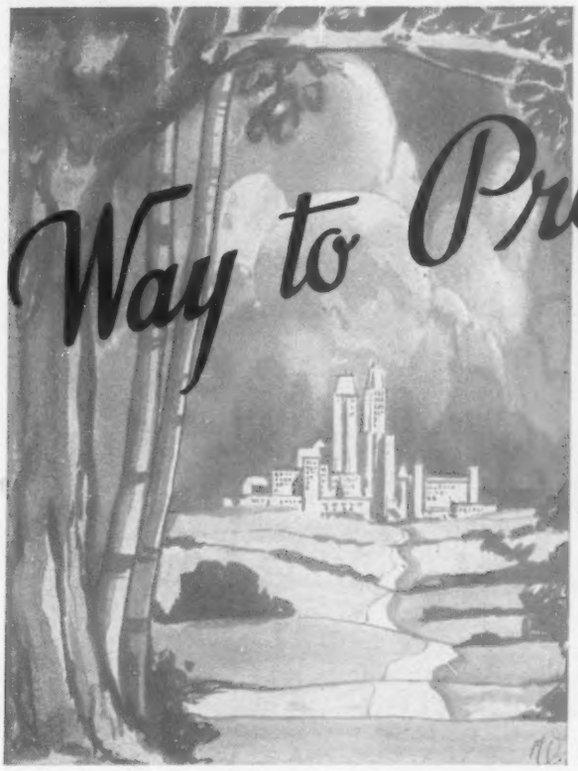
INLAND STEEL CO.

38 SOUTH DEARBORN STREET, CHICAGO
Detroit • Kansas City • Milwaukee • St. Louis • St. Paul

SHEETS STRIP TIN PLATE BARS RAILS
TRACK ACCESSORIES PLATES FLOOR PLATES
STRUCTURALS PILING REINFORCING BARS

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Way to Profits in 1938



■ VIEWED from the standpoint of the iron, steel and metalworking industries, 1937 was a year of climactic events, sharp contrasts, contradictory trends and more than necessary turmoil generally.

The year started auspiciously. Demand was brisk, prices were tending upward and activity in the first quarter was about equal to that in the corresponding period of 1929. Everything pointed to a steady, forward march to higher levels of prosperity.

This encouraging prospect no sooner was reflected in the business reports of January than difficulties began to appear. Sit-down strikes (p. 188) swept through motordom like a plague. Some local officials were indecisive in the face of lawlessness. Washington did not lift as much as an admonishing finger.

The tension at Flint and Detroit had eased only slightly before industry was surprised by the sudden announcement that the chairman of United States Steel had reached an understanding with John L. Lewis in respect to the unionization of the employes of the subsidiary companies. On the heels of this statement, several scores of companies in the iron, steel and metalworking industries signed pacts with Lewis unions.

■ With a substantial portion of the hitherto unorganized automobile and steel industries under union contract, the stage seemed to be set for a clean sweep for CIO. In April and early May the march of unionism to complete domination of two great divisions of industry appeared almost certain of success.

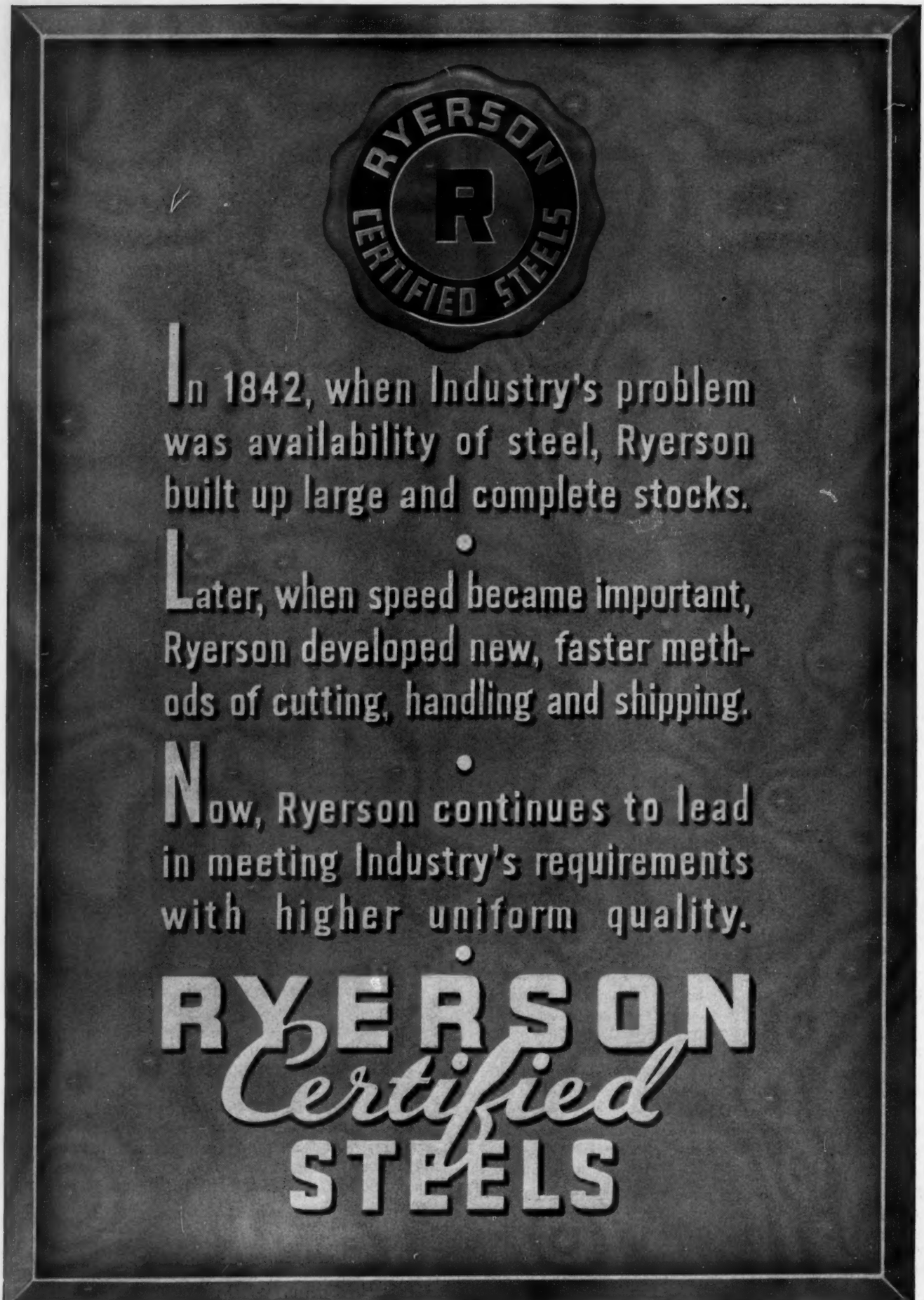
However, CIO leaders had failed to consider two factors. One was the growing opposition to union ruthlessness fostered by government partisanship. This was the outcome of the public's slowly developing indignation aroused by the sit-down outrages in Michigan. Second was the decision on the part of a few leading independent steel companies to resist domination by what they considered to be "irresponsible" union leadership.

Consequently, on May 26, when Tom Girdler of Republic was elected president of the American Iron & Steel institute, strikes occurred in some of the plants of the leading independents. The contest raged throughout the remainder of May and well into June. In the closing days of that month the backbone of the strike was broken by back-to-work movements.

The hard-earned victory of the independents proved to be an effective check to the CIO movement. It also served to crystallize public sentiment against the flagrant abuse of public rights by union leaders.

While these critical situations were developing on the labor front, the nation was witnessing an epochal political battle over the President's effort to make the judiciary subservient to the executive branch of government. Public indignation frustrated this coup, but not before a compromise maneuver, involving the resignation of a "conservative" justice, had given the President an opportunity to seat one man of his choosing to the highest bench.

■ These effective challenges to domination on the labor and political sectors of national life will go down in history as the outstanding events of 1937. Decades will pass before the repercussions of these contests dis-


RYERSON
R
CERTIFIED STEELS
In 1842, when Industry's problem was availability of steel, Ryerson built up large and complete stocks.
•
Later, when speed became important, Ryerson developed new, faster methods of cutting, handling and shipping.
•
Now, Ryerson continues to lead in meeting Industry's requirements with higher uniform quality.
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RYERSON
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STEELS

Write for 28 page illustrated book telling the complete story. JOSEPH T. RYERSON & SON, INC., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

appear. Important as they are in the social and economic history of the nation as a whole, they are weighted with particularly significant implications for industry. They serve to focus to a fine point of clarity the fundamental differences between the psychology of the present administration and that of industry.

Stripped of all subterfuge, the administration's policy is to preserve the capitalistic system so that its benefits may be utilized for social advancement. It proposes to redistribute income created by industry and labor so that an ever increasing share goes to the so-called underprivileged persons.

The majority of industrial executives hold to the theory that the social advances which the administration claims to sponsor can be promoted more effectively by maintaining and encouraging the profit motive. They advocate good wages, steady employment and reasonable profits, with sufficient rewards to invested capital to encourage private initiative. Promote profitable operations first, so as to develop wealth and income. Having created something to divide, then divide it equitably.

■ This issue predominated in every relationship between government and industry throughout 1937. Almost every effort of the administration to further its plan of economy had the effect of restraining private initiative.

Increased taxes all along the line, deductions for social security, penalties for undistributed profits, the cost of strikes, increases in wages out of all proportion to the productivity of labor, the expense of participating in hearings conducted by the national labor relations board, the cost of defending one's interests in income tax investigations and the responsibility of combating the continuous bombardment of anti-business propaganda from many sources —all these constituted a tremendous extra burden of expense, time and effort upon industry.

So oppressive was this super-load in 1937 that every business man concurs with sincerity and studied conviction that the year brought forth steadily increasing formidable obstacles to profit-making.

It was this handicap which, in conjunction with other factors, turned a promising 1937 into a year of contrasts, contradictions and confusion. Except for the recession which ensued, steel ingot output (p. 333) would have exceeded that of 1929. The same could be said of numerous other barometers (p. 283) of activity.

■ What of 1938? Basicly economic conditions are sound. Potential demand for industrial products by railroads (p. 204), building (p. 201), agriculture (p. 207), containers (p. 210), automobiles (p. 221) and numerous other consuming groups (p. 212) is sufficient to afford operations for the metalworking industries at a rate that will provide reasonable profits, if the proper incentive is vouchsafed investors to induce them to put capital into private enterprise.

Such incentive should come from the federal administration in the form of deeds, not promises, indicating that the rules and conditions affecting business are to be reasonably stable.

If the government should clarify these points and should undertake to work co-operatively with business to encourage private initiative, the way to profits would be fairly clear. Natural incentives would lead the nation back to the road of recovery.

■ However, it is doubtful whether the administration will change its policies radically. Its attitude will continue to be at least mildly anti-business.

In that case industry will need:

1. Statesmanship of high caliber.
2. Increased efficiency in sales, production and distribution.

Industry's statesmen will be called upon to decide delicate matters of policy affecting relations with the government, with labor and with the public. In these activities, industry must protect its interests steadfastly but must do it in a way that will not alienate public opinion nor will give anti-business forces openings for more drastic action against industry.

Nationalization of certain industries will be threatened if the present recession is prolonged unduly or if the public is permitted to gain the idea that business is responsible for the stalemate. Wise industrial statesmanship will recognize this danger and will act quickly to marshal industry's forces for a recovery movement on its own account.

■ Meanwhile industry must increase the efficiency of operations. In no other way can it offset the effect of present restrictions and burdens. Only by utilizing its most advanced knowledge of men, methods, materials and management (pp. 229-277) can it hope to override the obstacles to profit-making.

The extensive overhauling of United States Steel Corp. is typical of changes still overdue in some industrial companies. In spite of industry's encouraging progress in the rehabilitation and expansion of plant and equipment in 1937 (p. 276), much remains to be done in elevating all mechanical and metallurgical facilities to a balanced state of efficiency.

Merchandising can be improved. The mechanism of pricing still is open to refinement. Waste and duplication in distribution calls for renewed attention. Opportunities for more effective work await alert minds in every branch of industrial activity.

■ Underlying the functions of statesmanship and efficient management is an intangible known as morale or state of mind. Industry needs to apply its latent faculty for meeting emergencies.

Confronted by unprecedented floods in 1936 and 1937, industry's personnel rose to superb heights of accomplishment in restoring operations under trying conditions.

No one wasted breath or time to damn the destructive waters. No person employed the calamity as an excuse for failure to do his part in reconstruction. Everybody accepted conditions as he found them and drove through to mastery over the obstacles.

Companies whose personnel can apply that spirit to present problems—that will to do the impossible in the face of emergency—will find the open sesame to profits in 1938.

labor

■ AMERICAN industry must go forward, fight or no fight. Let us hope we can go forward peacefully and in an orderly manner without class cleavage entering into the question. Our standard of living has been obtained by narrowing the gulf between capital and labor. To widen it will unquestionably tend to lower this standard of living instead of raising it . . .

". . . . There is a place in the picture for both capital and labor, and that place can best be determined by an examination into the economics of both sides. Labor's fair share of the proceeds of business should be determined by what the pay envelope buys, and the relationship of costs to prices should be examined before a false money standard per day or per annum is proposed."

So, in a nutshell, W. S. Knudsen, president of General Motors Corp., pleads the case for industry in its labor relations and sounds a note of caution concerning "labor-aiding" proposals now in the legislative mills. Coming from a man who has been on the firing line continuously throughout one of the most trying periods of labor relations in modern industry, the comment is worthy of careful consideration.

Further, Mr. Knudsen declares significantly, "The opportunity for the individual to progress in any organization through ability and merit must be protected, in order that progress may continue and the American standard of living be kept in the vanguard of the world." To which every business man in this country will subscribe 100 per cent.

Equitable though these views may sound, they meet serious disaffection from organized labor which in the past year, with the seeming approval of some federal agencies, has added fuel to the fires of class hatred, has ruled against individual initiative in favor of mass benefits, and has waged bitter battles against industry—mainly for recognition of labor autocrats.

Labor's share of the national income has been rising steadily since the birth of large-scale industry in this country. For example, in 1850, this proportion was 38 per cent; in 1929 it had risen to 65 per cent, and in 1936 to 66.5 per cent—practically two thirds of the total national income. Industrialists recognize that continued progress of the American system will mean still further gains in labor's share, for on this basis alone can purchasing power be multiplied and production expanded.

Key to high wages is efficient production, and when labor insists on the unionized or closed shop it only bars the door to efficient production. In a recent address, Franklin R. Hoadley, president, National Founders association, stated that "the closed shop generally brings inefficient production and inefficient labor."

One has only to examine the experiences of the automotive industry in recent months to realize the exacting toll which attempts to unionize these plants have made on efficient production. The automotive industry, as yet, is of course not a closed shop, but the door is half shut, and events of the near future may decide whether it is to close all the way.

■ LABOR developments in retrospect for the past 12 months reveal that the march of the CIO against in-

In the late afternoon of March 23 the United Automobile Workers arranged a "show of strength" parade in downtown Detroit, a portion of which is shown here. All office buildings were closed and crowds of onlookers almost outnumbered the marchers. Expected trouble failed to materialize. Detroit News photo

dustry dwarfs all other considerations. With opportunity handed to him on a golden platter as a result of passage of the Wagner act and creation of the national labor relations board, John L. Lewis started his CIO drive along a wide front against two of the nation's greatest industries—steel and automobiles.

The latter was first, being more vulnerable because its employes were uninformed in the matter of unionization, and because they numbered in their ranks hundreds of younger men, many with few responsibilities, a large proportion of impressionable foreigners, and concentrated largely in an area of a few hundred square miles in Michigan.

It would be pointless to detail what happened in Michigan last spring; it is too well known, its implications and aftermath too well understood. The snowball of the United Automobile Workers division of the CIO swept thousands before it, many unwillingly, but afraid to resist. Agreements were negotiated with all the leading car builders except Ford. Public officials found themselves thrust on the fire of public opinion and were well roasted for their failure to observe the letter of the law in labor insurrections. Their timorousness could be understood by those on the scene of some of these labor disturbances, but nonetheless they were definitely on the spot temporarily.

Today the situation simmers down to about the following: The UAW is fighting to remain on its feet; to remain solvent; to weld together dissenting factions in its own ranks; to persuade (in one way or another) its laggards to pay up dues; to stagger through the present period of unexpected layoffs until production turns upward again.

The union must make some attempt to carry out its avowed intent of organizing Ford workers, which so far has failed miserably. As yet, the UAW has failed to work out a satisfactory revision of its contract with General Motors. Contracts with other builders expire in March and the union must act to put across more sweeping demands. Business conditions this spring will tell the story.

At present, chances look slim for the UAW. It was roundly beaten in an effort to invade the political arena in Detroit in November. The present business recession and the fact the bloom is off the UAW rose are further complicating factors. But perhaps the movement is too much of a gold mine for its sponsors to let slip by the wayside. Sudden extinction is hardly likely.

Some interesting chapters in labor history may be written this year when the UAW comes to grip with Ford. As yet there have been only a few mild skirmishes, all of which must be conceded to the River Rouge genius. Pending is the decision of the labor relations board in its case against Ford heard recently in Detroit. Testimony covering 1600-odd pages was taken at the hearing which, by the way, was a travesty as far as Ford attorneys being able to receive any consideration from the trial examiner was concerned.

Officers of the UAW for months have talked of how many thousands of Ford employes have joined their ranks, of how easy it is going to be to bring Ford to terms, of the ten or more ways Ford production can be throttled. But beyond several unsuccessful attempts to tie up assembly plants outside of Detroit and the distribution of defamatory literature to Ford employes at the Rouge, the UAW has met with no success. And by virtue of Ford's strategic and consolidated position in Dearborn, plus the elaborate supervision of employes, it is more than likely his plants will remain impregnable in spite of all the union or the government missionaries can do.

■ TURN now to steel. Six hundred thousand employes—unorganized except for employe representation plans—a fertile field to cultivate for $600,000 monthly in union dues. Small wonder that early in the year steelworkers were slipped handbills as they left their turns, proclaiming in bold-face type that "President Roosevelt Wants You to Join the SWOC."

First Lewis made a tactical move calculated to put the pressure for unionization on one group of producers. Upshot was the news on March 2 of an agreement between the Corporation and the CIO, followed by signed contracts on March 17. Here were operations moving along steadily at better than 80 per cent. Why not let well enough alone?

But to many a steelmaster with first-hand experiences of prior union movements in the steel industry the step was a great surprise, though little was writ-

Thousands of loyal steel employes marched in demonstrations against the C.I.O.

ten into the SWOC agreements beyond formal recognition of the union's membership.

The industry's opposition to unionization is no mere whim, based as it is on fundamental economic reasons. In the first place, the majority of employes do not want it. In the second place, labor movements, CIO included, have been erected on a foundation of "enmity rather than amity" with management. In the third place labor unions have failed to demonstrate even a semblance of responsibility for their members or an accounting of their activities, aims and purposes.

By the middle of June CIO had negotiated agreements with some 40 companies in the iron and steel and metalworking field, covering 40 per cent of the employes in the industry. Of the 17 largest steel producers, seven signed CIO contracts. Attempts to extend unionization of the industry continued through April, May and June, but met with firm resistance from "Little Steel." The results of these futile attempts are history. Responsibility for the fights, the closed plants, the loss of wages, the bitterness which ensued rests squarely with the CIO.

In the words of Ernest T. Weir, chairman of National Steel Corp., "The companies had violated no law. They announced before and during the strike that they were willing to meet and bargain with any representative of any of their employes. But they refused to sign a contract with the SWOC. The union leaders admitted that there was no question of hours, wages or working conditions. They simply demanded that a contract be signed."

And the companies had sound reasons for refusing to sign a contract, because they knew it would be used as a coercive weapon for new members, that it would be represented as a company endorsement of the union, the first step toward a closed shop and the checkoff system of dues collection now prevalent in the coal industry.

The following tabulation shows employment payrolls and average hourly earnings for the first ten months of last year for the entire steel industry. Significant is the sharp increase in hourly earnings from January to April.

1937	Total Number of employes	Total wages	Average hourly earnings, cents, wage earners only
January	544,997	$76,423,054	72.5
February	556,077	74,277,665	72.8
March	577,050	90,863,016	79.3
April	589,351	94,321,859	85.6
May	595,354	92,931,305	86.6
June	555,743	87,519,613	87.7
July	593,906	90,549,660	86.8
August	603,106	92,663,389	86.1
September	602,729	86,160,875	84.3
October	586,000	76,191,000	...

■ AT the end of February this year, all union contracts with steel companies expire. What then? Will they be renewed *status quo?* Will they be dropped? Or will the SWOC take the next step toward the closed shop and the checkoff?

Any answer at this stage must be largely guesswork, but there are a few straws in the wind which might be construed as indicating what March will bring. In the first place, what can John Lewis show his members as proof of the value of belonging to the CIO and paying the union dues? Nothing which any steelworker not a member has not likewise enjoyed.

Further, it is problematical just how many regular dues-payers are left in the ranks of the SWOC. Some guesses are as low as 10 per cent of the total number of employes in unionized plants. Can Lewis talk with authority to managements when he represents only a handful of men in their plants? Probably he can when it is considered that it only takes 1 per cent of a plant force to call a strike, and only 5 per cent to keep the struck plant closed.

The situation early this year may be quite the reverse of last year when the SWOC drove through its contracts. Labor was riding high in the saddle, op-

erations were near the top, managements were chiefly concerned with keeping their mills rolling.

■ OUT of all the welter of discord arising from labor relations in American industry during the past year emerge several observations which imply certain needs:

1. The new deal labor policy has been a total failure and must be radically overhauled and reshaped on the basis of sanity and fairness.

2. Employers generally recognize the value of organization by employes, and are anxious to accept it when formulated along the lines of co-operation and responsibility, instead of the present "jungle law" tactics of the CIO.

3. Labor unions in one way or another, to survive, must be willing to give the same accounting of their funds, to acknowledge the same responsibility for members and leaders, the same fair dealing to the public now required by law from business.

4. Unions must abandon their theories based on an economy of scarcity and must realize that higher wages can result only from a more efficient and an expanded production, and not from an arbitrary jacking up of basic wage rates and leveling off individual ability to the plane of the least efficient.

5. The woeful misconception of industry and business on the part of government officials is easily explained by the fact these officials for the most part have never had the remotest connection with any phase of industry. There are two roads open to correcting this situation:

a. A determination on the part of business and industry to participate actively and aggressively in politics, local, state and national, to the end that they can contribute some of their knowledge to administration of public affairs.

b. The building up of facilities to provide future public servants with a thorough education and training in the various phases of political science before they are entrusted with such far-reaching phases of collectivism regnant at Washington.

In the matter of training new recruits for the hordes of skilled workmen in years to come, the past year has seen little diminution of effort. A. E. McClintock, commissioner of the National Founders association, states "there is still a general shortage of skilled help." Training programs throughout industry are being pushed to fill the ranks of skilled shop men, and are even being extended to develop better-equipped salesmen and executive personnel.

In the field of industrial relations, as might well be imagined, there is acute shortage of trained executives and at least three universities—Michigan, Chicago and Princeton—are regularly sponsoring symposia and roundtable discussions with the aim of better informing present personnel in this new and expanding field, and of training new men.

Expenditures for welfare and health of industrial employes have been multiplied in view of the improved position of most industries during the past year. For example, Dr. C. D. Selby of General Motors Corp., reports the company and its operating divisions spent in excess of $5,000,000 during 1937 to protect the health of more than 210,000 plant employes on their jobs. A large part of this sum was spent on dust and fume control.

Dr. Selby predicts that as a result of an intensive industrial hygiene program, "It is reasonable to expect the ultimate absolute control of occupational disease as well as a marked reduction in all employe sickness of nonoccupational origin, thus contributing to the general community health." The industrial doctor, whose primary job was the treating of injuries now finds that his work is chiefly concerned with the broader field of prevention, both of accidents and occupational diseases.

Efforts to improve stability of employment, especially in the automotive industry, have proved fairly successful. For the second successive year the automotive industry introduced its new models in the fall instead of at the turn of the year. And while production of new cars declined 68 per cent in September, employment fell by only 20 per cent. Previously cited figures of employment in the steel industry show the maximum fluctuation of employment in the industry, that is from the low figure to the high, was only 55,209, or about 10 per cent.

Such sights as this group of sitdown strikers in a belligerent pose on the roof of one of the Chrysler plants in Detroit were common during the wave of labor unrest which swept the automotive industry in 1937.
Detroit News photo

■ RELATIONS of an industry with the public come under the heading of intangible assets, often referred to as "goodwill and other assets." Their net worth is at times grossly underestimated; the technique of establishing favorable public relations only recently has become better understood and appreciated.

The fact that an industry has no direct dealings with the public as far as sales are concerned does not mean it can forget the matter of public relations. In one way or another, every industry owes its success in the final event to the public. Employes, stockholders, customers all are veins through which flows the lifeblood of any company, and it is only prudent management to guard against the onset of any destructive virus in these channels.

On this score, a well-directed program of public relations can be considered a profitable investment in what one authority has called "preventive maintenance of goodwill."

"Public relations," says Paul Willard Garrett, director of public relations for General Motors Corp., New York, "are not and never can be the functions solely of a small group or a special department within an organization. On the contrary, public relations are inherently the responsibilities of every member of an organization from top to bottom. To the public, even the most lowly employe is the company.

"Public relations, then, are not something to be created on the outside, but must come from within, and accordingly must have their basis in a sound point of view or attitude. What we do, in the long run, is so much more important than what we say."

Thus perhaps the chief function of a public relations department may be the promulgation of this viewpoint among the personnel of a company, with an effort to suggest constructive criticism of what a company does.

Continuing, Mr. Garrett observes that "in our individual relations with people we gradually come to know what actions are constructive and helpful and what are not; it is only when these relationships are multiplied by several hundred or many thousand that we are inclined to become confused and to feel that some special or involved technique is required. Reduced to its simplest terms, it might be said that good public relations result from doing more and more of the things people like, and constantly fewer of the things they do not like."

This implies a knowledge of what people like and do not like as far as corporate behavior is concerned — a difficult task when consideration is given to the susceptibility of the public in general to various forms of propaganda. Hitler and Mussolini might be considered masters of the art of public relations, but in their cases, it was not so much a matter of ascertaining what their public liked as it was of telling the people what they liked, and backing up the telling with forceful persuasion.

"Obviously," concludes Mr. Garrett, "if business is to render the highest degree of service to the public, open channels of communication must be maintained, two-way channels, in order that business may understand the public better and the public, in turn, may understand business."

A vice president of a large utility company believes "the handling of the public relations of a business is primarily seeing that the business gives to the public a satisfactory service consistent with fair treatment to employes and capital"—probably as concise as interpretation as could be wished for. Whether businesses are making progress in studying their own performances analytically, this official does not profess to know; but he thinks they are, noting "many signs of an increasing effort to 'tell their story' agreeably."

"But after all," he concludes, "that will be effec-

tive in the long run only if it is an agreeable story to tell."

To set down in black and white just what comprise the functions of a public relations department as they are operated today is virtually impossible, because in different companies these divisions operate differently. In some nothing more than glorified publicity departments, in others they are responsible for release of all corporate information, promotional activities, radio programs, institutional motion pictures and the like, as well as maintaining a close contact with industrial relations activities. In still other companies, public relations are cloaked in almost complete anonymity.

As far as labor or industrial relations are concerned, that is a story in itself. It is often difficult to determine where industrial relations leave off and public relations begin, but the present discussion will be confined strictly to the latter activity.

In a general way, public relations activities are directly associated with the chief executive personnel of a company, at the same time maintaining a connection with the sales department, since fundamentally public relations is a selling job, even though indirect.

There are four main channels through which public relations divisions operate: Newspapers and magazines; radio; motion pictures, and public addresses of officials before such groups as chambers of commerce, dealer organizations, clubs and the like. In addition there are usually special activities handled by relations departments, such as for example, ceremonies attendant to the recent launching of new ore freighters by a subsidiary of the United States Steel Corp., or the truck caravans sent around the country with special exhibits by General Motors Corp. Other extra-curricular events might include the arranging of inspection trips through plants, open-house celebrations for the benefit of communities in which plants are located.

Naturally, there is some interconnection between the four primary channels of contact with the public. Thus a radio address may be supplied to newspapers, or a public address may be directed to certain magazines having a connection with the field discussed by the speaker. Or the radio may be used to expedite the transmission of an executive's remarks to a number of interested groups at distant points. The correlation of these four channels and the proper direction of information into them is one of the jobs of the public relations department.

The motion picture is no new tool for industry as far as sales departments are concerned, but lately the institutional value of this form of communication has been more widely appreciated. United States Steel Corp. has completed a picturized version of iron and steel production in its plants, all in color, supervised by the public relations department, which will prove a valuable implement for informing the public, especially the young generation in schools and colleges, about what this great industry is doing in its nation-wide plants.

Institutional value of radio presentations is illustrated by such popular entertainment as that sponsored by the Carborundum Co., American Rolling Mill Co., and others. These two in particular are cited, becuase the sponsors are at least once removed from the ultimate consumer who is the listener, and constitute more of an institutional effort than a merchandising effort. Results naturally are difficult to measure, but at least a certain amount of public-consciousness of these companies has been stimulated.

One of the greatest opportunities for public relations departments in recent years has been the aiming of their work to combat the business-baiting tactics of the New Deal. In this task, industry is up

Men, women and children, many of whom had no direct association with the companies concerned, took the opportunity to see how steel products are made. Conservatively, more than 100,000 attended these "open houses" of the steel and metalworking industries in 1937

against some real competition, for the federal government at the moment has created the most stupendous and effective public relations program in its history, which, despite the legitimacy of its daily outpourings, must nevertheless be weighed as a definite move to merchandise the new deal to the public.

An article by Stanley High appearing in the *Saturday Evening Post* reveals in detail the extent to which government agencies literally inundate the public with news and "educational" information. Statistics show 82 government departments, bureaus, boards, administrations and authorities which have so-called offices of information and publications—31 of which were born during the era of the new deal.

In 1936, these offices dispatched, postage free, some 669,352,000 pieces of mail, a bulk which helped materially in boosting the government's free-mail bill for that year to an estimated $32,000,000, compared with $9,000,000 in 1932. On the government payroll are scores of some of the ablest newsmen in the nation, keeping a constant check on New Deal activities in the 48 states, and at the same time keeping the populace of these states well informed about what the government is "doing for them."

Selling the social security act alone to 26,000,000 eligible citizens was a public relations job of the first magnitude. A staff of 33 in Washington headed by Louis Resnick, a trained newspaper man, reinforced by the push of 12 regional offices, soon flooded the country with newspaper releases and posters of all sizes and descriptions, 3-minute newsreels and 4000-odd radio programs, to the end that the social security program definitely was "sold" to the nation at large.

Housing Administration "Sold" Its Program

The same sort of campaign was mapped out in connection with the activity of the Federal Housing Administration which, through a public relations department including until recently some 30 writers, grinds out a steady flow of news releases for daily and weekly papers, designed to stimulate and "sell" the idea of home building. Newsreels and radio programs also are used extensively by this department. For example, its ten 6-minute newsreels are estimated to have had a combined showing in commercial theatres before 91,000,000 people.

The Works Progress Administration has pursued a similar course of public education in newspapers, magazines, radio and moving picture fields. While all this public relations effort has been put forth with the noblest of motives—that of helping to build a better America—nevertheless it constitutes the finest kind of sales propaganda for the new deal, dressed as it is in the official robes of the national government.

In searching for an explanation of the landslide of votes which the new deal received in the 1936 election, there is need to go no further than this masterful job of public relations which has been engineered in Washington. Summing up the achievement, Dr. High in his article aptly observes: "The resources with which it (the new deal) may be made unbeatable are not those of the Democratic national committee, but of the government of the United States. The Republicans, in 1940, might beat the Democrats. I doubt if they can beat the government."

Industry Constantly in Public Eye

Through the medium of newspapers, industry has been placed more prominently in the public eye in the past year, as a result of the almost universal outbreak of labor troubles. Strikes, sitdowns and fights among employes must be considered news by editors and as a result, scores of plants have found their troubles on the front page, often in an unfavorable light as far as the management was concerned.

For the most part, however, the press has been impartial in its reporting of labor troubles, especially when it is considered that newspapers categorically assume the viewpoint of the man in the street who is, after all, their customer. Perhaps some of the credit, at least, for impartial reporting of labor unrest in industry must go to public relations departments which have found their routine disrupted time and again to supply facts on labor disturbances to newspapers.

Time was when newspaper editors would give the fishy eye to industrial news, considering it almost as bad as press-agent blurbs. This attitude has changed, and nearly all metropolitan newspapers now reserve space for industrial developments, whether they be concerned with plants, personnel or processes. Columnists writing on nothing but trends and outlook for business and industry have sprung up as important staff members of the daily press. This change represents a distinct forward step by industry in its public relations.

An excellent summation of the general problem of industry's public relations and the effect which

changing conditions have exerted on the problem is furnished by Dale Cox, former writer of a business column in the *Cleveland Plain Dealer,* and now associated with the public relations department of International Harvester Co., Chicago. He says: "The technique of public and industrial relations is an outgrowth of the growing complexity of our economic and social societies. It results from a realization on the part of everyone that it is not possible to carry on business today without regard to new and important factors in the social and political as well as the business world.

"I need only call attention to a few of the points of contact between a great, modern business or industry and the public. First, it has its contact with its stockholders who represent ownership; it has its contacts with its customers who may, or may not, be a large section of the general public; it has its contacts with its own employes—a highly important contact. Its workers are its employes as long as they are on the job and after that they become a part of the general public. Finally, it has its contacts with the general public which is the great mass of the people of the nation.

"The past two or three years have been important ones in the field of public relations probably because of the changing attitude and viewpoints toward social and political and public problems. This has called for a serious approach to the problem of adequate and honest interpretation of business and industry to the general public and a similar adequate and honest interpretation of the attitudes and viewpoints of the public to the managements of great business enterprises.

Public Relations Intangible, But Necessary

"This has been true although it is not possible for industries to measure the value of good public relations in specific terms of dollars and cents. Good public relations is not a tangible item such as the sales totals for any given year, but on the other hand, good public relations are just as important and are reflected just as much in a company's profits as more tangible items such as expenses for sales promotion or advertising. Business men generally today fear public illwill as perhaps the greatest of all deterrents to business profits.

"Despite the inclination of some men engaged in the field of public relations to make of it something mysterious and highly complicated it may be practiced simply. In fact, the more simply it is practiced the more likely it is to be effective. Reduced to its ultimate essence, good public relations are nothing more than the continued maintenance of public goodwill. If that be considered the foundation of a public relations policy then it is a relatively simple thing to judge all suggested business policies by asking the question: Does this policy make for public goodwill or illwill? All the techniques, formulas, devices and methods of handling public relations simply fit into the broad general purpose of building public goodwill.

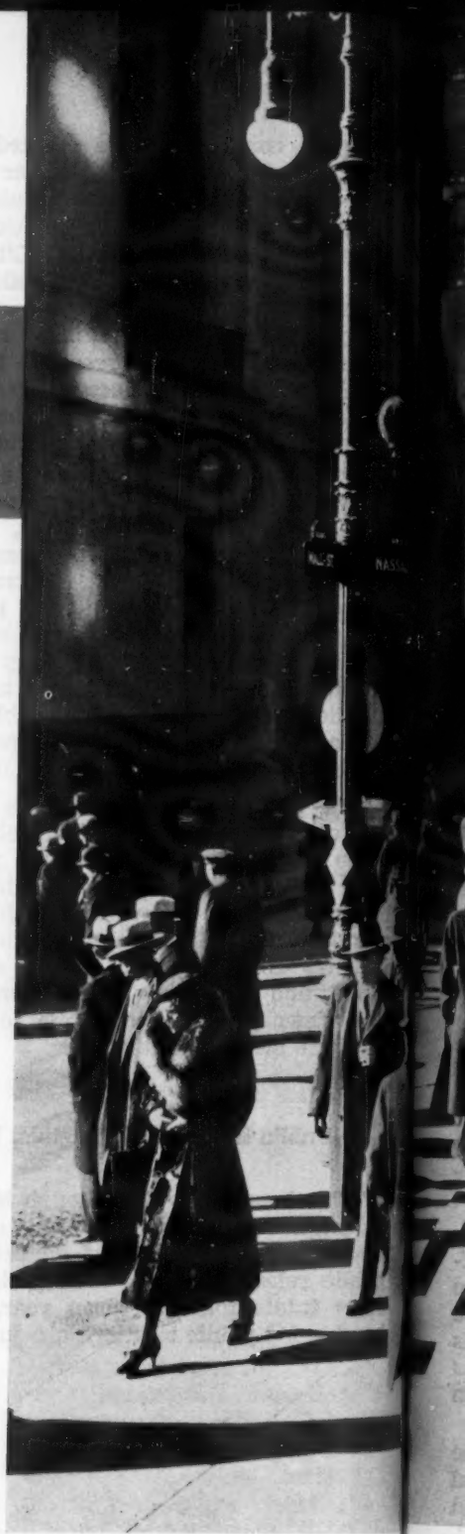
Labor Relations Receive Much Attention

"During the past year the problem of labor relations has had a great deal of consideration from men engaged in the practice of public relations. But this is only one phase of any broad program of public relations. Indeed, labor relations is such a field in itself that under almost no consideration should it be regarded as anything more than a problem related to public relations. Industrial relations problems should be handled by a separate group of management specialized and trained in the field of industrial and labor relations. Public relations men should, of course, be familiar with the problems of industrial relations but they should not undertake to direct them.

"It seems to me that the experience of business and industry in the last few years has made it clear to industrial managements that appropriation of adequate funds for the carrying on of public relations work is highly essential. More and more industries are making such appropriations and developing this important division of their work."

The past year witnessed increased effort on the part of manufacturers to emphasize to the public the role their industries are playing in the development of the national economy and in the raising of the standard of living for all. Invitations to visit steel mills were issued, and literally thousands took advantage of specially conducted tours

finances



■ THE kaleidoscopic turn of events of recent weeks, marking a deep decline in business, has confronted management of steel and metalworking plants with a materially different outlook this year than 12 months ago.

Last year business was moving steadily upgrade, with good prospects for at least several months to follow. As it subsequently developed, business in steel and the metalworking industries well surpassed most expectations in the first half.

Today steel operations are at a low ebb although most business observers are still inclined to regard present inactivity as a recession rather than an initial stage of a new depression.

If this is a temporary lull, the steel and metalworking industries should weather it without much difficulty. Certainly, they are in a stronger, even though more confused, position than a year ago. The last quarter will undoubtedly show a net loss, but so substantial were profits during the first three quarters that the year as a whole should be considerably better than 1936, or than any period since pre-depression years.

For the first nine months returns from steel companies representing 82 per cent of ingot capacity indicated a total net profit for all of the industry of $236,000,000, against $137,572,488 for the full year of 1936. Hence, despite a probable reduction in the last quarter, the net gain for the year should still be large.

For metalworking companies other than steel producers, the percentage of increase will be less impressive. Earnings for the first nine months of 50 typical companies, as summarized by STEEL at the time, indicated an average increase for these companies of 41 per cent over the corresponding period of the preceding year. Last quarter returns will undoubtedly make inroads into this percentage of gain.

Until balance sheets are available for the entire year the exact degree in which steel and metalworking companies have been able to increase cash, reserves and surplus will, of course, not be known. It is reasonable to assume a general improvement as compared with a year ago. But all the hindrances and underlying uncertainties which have bedeviled business management in recent years have been brought into bolder relief by developments of the past few months, and caution will likely continue to be exercised in the making of new expenditures for the time being.

Similarly, prudence will probably continue to mark for the present the attitude of investors. Unsound tax regulations, continuing labor discord, excessive governmental restrictions, uncertain monetary policies, a still greatly unbalanced federal budget—these and other disturbing elements all finally combined several months ago to create acute general concern as to the safety and liquidity of investments. In fact, deep apprehension grew as to the status of property rights themselves; and while certain ameliorating influences have since developed, much of this concern is still in evidence.

It was the crystallization of this sentiment late last summer, touched off, perhaps, by an over-bought com-

Wall street and Nassau, in the heart of the nation's financial capital. Wide World Photo

modity market and disconcerting events abroad, which marked the beginning of the sharpest recession in the annals of the steel and metalworking industries. The tip-off on the investment market came a little later with the public offering of certain securities which had to be absorbed largely by the underwriters.

Various other large steel and metalworking companies with public financing programs under contemplation subsequently withheld action, and the smaller companies, which rely largely upon their earnings, set about with all others energetically converting inventories into cash. Later, commercial loans, which had been undergoing an advance in volume for almost two years, began to drop, although moderately. At the moment that is the way the situation stands, with much improvement and expansion work awaiting a return of confidence by the investor and the consumer of goods, to say nothing of the steel or metalworking company itself.

Reflecting much of the present uncertainty of management a prominent New England tool builder commented with particular respect to industrial credit:

"Credit a year ago and credit today are two entirely different things. Last year it wasn't very hard to predict what was coming during a reasonable number of months ahead. Today the man does not live who can prophesy.

"Industrial credit, as I see it, is a corollary of national credit and when business men are worried about that they refuse to take chances in their own businesses. There is plenty of credit, but not the private will to take advantage of it."

He continued with a dig at business itself, and an expression of his view as to the cause of the recent slump. "With the government by word and deed avowing itself an arch enemy of business, business men sat idly by and allowed the government to subsidize the recovery we have already had. The moment the subsidy began to shrink business men feared to take up the battle and carry it on. The result is the present slump in business, which will continue until either private industry or the government does something to start the ball rolling again. Whether this will happen or not and when, is anybody's guess."

■ UNTIL the closing months, when new security flotations in general fell off sharply, there was an increase in the new corporate capital issues. In the first nine months the amount of such offerings, out of a total of $3,406,000,000, was $1,028,000,000, compared with $778,000,000 in the corresponding period of the preceding year when total flotations amounted to $4,682,000,000. The balance represented refunding issues and in the late summer, interestingly, the volume of securities representing new corporate capital was actually greater than the total of the refunding issues.

With respect to business loans and the declining rate of interest on investments over recent months, one large eastern banker advised:

"Our business loans began to expand slowly in the early part of 1936 and continued, with moderate interruptions, reaching a peak for several years past early in November. To this extent we continued the increase somewhat longer than did the reporting (Federal Reserve) member banks in New York City and in this country as a whole. There has been a moderate decrease in the past few weeks.

"The changes in volume of applications for loans follow the changes in industrial activity. Undoubtedly, some loans will be made in the early part of a recession due to piling up of inventory, but, in general, it seems improbable that the volume of loans will not follow the rise and fall of industrial activity.

"I think the causes are quite clear as to the declining rate of interest on investments over the past few months. With the moderate but steady increase in bank loans and the general expectation of good business this past fall with a further expansion of loans, the resulting slight firming in open market rates was logical. However, the action of the Treasury in releasing $300,000,000 of sterilized gold shortly after Labor Day, plus the announcement of the Federal Reserve

board that it intended to resume open market operations, reversed the money picture.

"Added to this, there was a substantial contraction of bank credit, particularly in brokers' loans. As a result, banks and other industries began a scramble for short term governments and the strength in this section of the market was gradually spread to longer maturities.

"It is inevitable that as loans decline banks are forced to maintain their income by adding to their investments."

■ EVER since the 1936 tax law was hastily conceived and put into operation, the undistributed profits surtax has proved a bugbear to management in steering a sound financial course. It has been condemned on many counts, such as the penalizing of thrift and business initiative, and the impairing of ability of corporations to expand earnings and to withstand business depressions.

It has been criticized as uneconomic because of its effects on corporate policies, and as deficient as a regulatory device, because it bears equally upon those who should pay out a larger share of earnings as dividends and those who should strive for a stronger financial position before distributing any earnings.

In 1936, the first year of its application, many companies, although far from all, were influenced in making extra distributions to stockholders in order to save on taxes. Possibly the clearest idea as to the extent to which this was done is to be gained from a summation recently compiled by the National Industrial Conference board, New York.

In reply to the board's question as to whether dividend policy was affected by the tax, 193, or 61 per cent of the companies responding, answered in the affirmative. Of the total replying there were 237 manufacturing concerns, and of this number 152, or 64 per cent, said that dividends had been increased because of the tax.

One hundred and forty six companies reported a percentage of increase, which on an average amounted to 51 per cent in dividend payments because of the tax. One hundred fourteen manufacturing concerns reported a 53 per cent increase.

The board then went on to point out that in the 5-year period ended in 1929, the ratio of dividends to net profits for all corporations other than finance varied between 56 and 71 per cent, with the average for the five years amounting to 64.8 per cent. The ratio in 1936, returns indicated, was approximately one-fifth higher than this average.

Tax Causes One-Fifth Extra Dividends

This increase, the board commented, together with the average increase of 51 per cent in dividends reported by 146 corporations, and the fact that 61 per cent of the corporations stated they had paid larger dividends because of the tax, suggested that for all corporations which reported a net income the tax caused an increase of at least one-fifth in the proportion of earnings distributed.

Since the law became effective, less than one-fourth of the corporations resorted to bank loans and other forms of short term accommodations because of the tax. It was realized by the board, however, that too short a period had elapsed to permit this to be of particular significance.

Indeed, the preponderance of opinion was that there would be increasing reliance on banks and other outside sources for working capital as time went on unless the undistributed profits tax were greatly modified or eliminated entirely. Few new forms of security issues or types of borrowing have been developed as a result of the tax, it was revealed.

Tax revision is being promised in Washington but few persons entertain hopes of early action. Moreover, there is doubt as to what form of substitute for this tax might be made. That there will be a substitute is taken for granted, for as long as the government continues its present policy of spending more than it takes in, it is not going to abandon one source of revenue without providing another, it is believed. Will the substitute, when and if it comes, prove even more distasteful or more difficult for business to adjust itself to than the present one?

Consequently, as a matter of sound business caution, the tendency of management is to move more conservatively in the distribution of profits in excess of ordinary dividends. This trend was indicated over the closing weeks of the year just ended, although admittedly the beclouded outlook was not conducive to special dividend action, particularly by those faced with sharply increased costs. Difficulty in arranging new finances under prevailing market conditions undoubtedly was also a deterrent in some cases.

■ TAX penalties are admittedly heavy. For instance, on an adjusted net income of $500,000, with, say, $150,000 already paid out in dividends, a company would have to pay a surplus tax of $62,000. Subtracting this amount from the $350,000 after having paid original dividends, the company would have left for working capital $288,000.

Supposing the company decided upon an extra dividend of possibly $50,000, what then would be the effect on working capital? The surplus tax in this case would be $48,500, instead of $62,000. But there is the $50,000 which was paid out in extra dividends and this plus the $48,500 leaves a balance of $251,000, as against $288,000 if no extra disbursements had been made.

Stockholders benefit by the extra $50,000, (and the government by the $48,500), but working capital suffers by $36,500. Still larger extra dividends would result in even heavier inroads into working capital, despite elimination of some of the extreme tax penalties.

However, as indicated in various comments to STEEL there has been, apart from the special considerations noted in the closing weeks of last year, a more conservative attitude in the payment of such extra dividends. More companies are preferring to pay the tax, stiff though it is, rather than unduly deplete working capital. To do otherwise (assuming no early change in the law) would involve, they contend, the entire capital structure and future prospects of their respective organizations.

Their philosophy is that to disburse more than should be properly paid would necessitate replenishing their cash for needed maintenance and improvements and for emergency reserves by either selling additional securities or borrowing cash. Neither course,

(*Please turn to Page* 371)

construction

■ MAJOR problems still confront producers and fabricators of steel for the construction and heavy engineering industries. The unbalanced relationship between profits and volume, fluctuating widely for years, and long an unsolved question in the heavy steel fabricating industry, persists. Profit is too often sacrificed for tonnage.

This was true in the days of tremendous tonnage bookings back in the 1929 boom and only to a slightly less degree during the year just closed. Average net profit was less in 1937 than in 1936 when 5.1 per cent on sales was earned, approximately the same volume being booked.

With official figures for December estimated, it is doubtful if last year's bookings will reach the 1936 total of 1,609,016 tons. Yet for nine months, contracts of 100 tons or more each compiled weekly by STEEL ran substantially ahead in tonnage. Bookings in November went up sharply to approximately 150,000 tons and final tonnage was close to that of the previous year.

Predictions, estimates or hopeful analytical research as to what the new year holds for the construction and engineering industries regarding heavy steel are uncertain. Doubt is unusually rife because of the unsettled industrial, financial and political situation, involving taxation, labor, transportation and financing. Politics is the most unpredictable of the variously mixed factors. Yet there are some trends, apparent in the year just closed, which are likely to be stimulated.

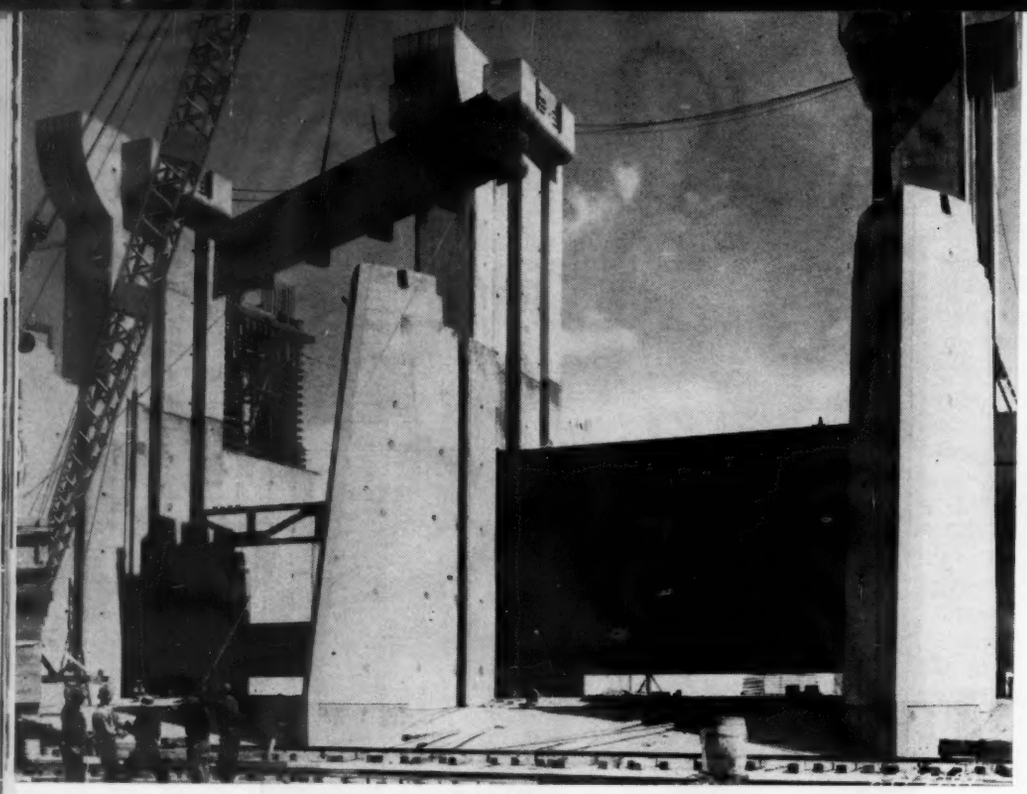
Loudest tune now being played by the rather discordant new deal band appears to have a gigantic housing program as its theme. No one apparently knows just how many houses are projected, where they are needed, what financial terms will finally prevail or of what materials they will be constructed. As a tonnage outlet for structural steel during the next 12 months, estimates are small. So many complicated factors enter into this program, labor and material costs and financing, that most steel producers are convinced no great tonnage will immediately reach the mills.

The potential number of new house owners who have been able to build up even a moderate reserve for initial payment is relatively small. Should the program actually get underway during the year sales of refrigerators, pipe, heaters, builders' hardware and other small items would naturally be stimulated. But unless we are to have steel-framed or all-steel houses, and the prospects are all against this, additional tonnage for shape mills and fabricators will be nil during the present year at least.

Solution of automotive traffic congestion in the larger cities and in many of the less populated communities is becoming a paramount need. Success of the west side elevated highway in New York, the full completion of which will bring even more satisfactory results, has stimulated interest in other steel structures of this kind. The American Institute of Steel Construction is now sponsoring competition for suitable designs with substantial cash prices for the best.

Chicago, San Francisco and Boston especially have traffic problems which well-surveyed and designed elevated highways would reduce. At Boston, the proposed elevated highway between the South and North stations is being seriously considered. Potential tonnage for such work is large.

While privately financed construction and engineering work in 1938 has been estimated as likely to



Substantial tonnages of structural shapes were used during the year in construction of western dams. The dam at Fort Peck, Montana, took 20,000 tons of shapes, reinforcing bars and other steel. Photo shows spillway gates at Fort Peck, fabricated by R. C. Mahon, Detroit. Its part of the job contained 4000 to 5000 tons of steel

approximate the volume of 1937, late third-quarter developments caused a revision of earlier estimates in some quarters. Publicly financed construction, declining for months, is likely to continue its gradual recession.

Taking the long range view, a moderate reduction in the total volume of construction is probable as compared with 1937. This, of course, may be changed by a resumption of governmental spending for public works and loans. Industrial plant expansion which more than made up the gap caused by declining public work during 1937, is expected to drop.

Exclusive of the government's proposed residential building program, under conditions approaching normal, new family dwelling units might be estimated around 215,000 compared with 190,000, roughly, during 1937. From the standpoint of heavy steel tonnage such estimates mean little unless the steel-framed and all-steel house enters the picture on a larger scale. There is little to indicate it will.

Potential steel tonnage in house-building is large. But steel houses have not yet been accepted by the general public; they have not been sold as an economic advantage, while certain architectural drawbacks continue. Until the women of the nation are convinced of steel house advantages, there will be slight hope for large tonnage consumption. Nevertheless, the use of steel is increasing in the construction of individual dwellings, but as parts rather than in mass or major consumption. In combination with other materials, more steel is being employed in family house construction.

Fabrication of steel on a mass production basis for houses appears to be some distance away. Assuming steel houses were generally accepted by the public and comparison with the automotive industry for standardized high output made possible, fundamental economic laws work against such efficient assembly and fabrication of materials. An automobile moves and has an economic life or value of about 18 months. At the end of that time, the seller or financing company has the money at which the unit was originally sold or substantial equity which can be liquidated with reasonable assurance against heavy loss. A house doesn't move. The old homestead cannot be moved around the marts of trade.

Once, the economic life of a house, the period in which efforts were centered toward burning the mortgage, was about 11 years. Now it is close to 20 years, an economic factor removing mass production housing from high-speed assembling methods. Few possible outlets for steel have been given the research, attention and study all-steel housing has received, and, while progress has been made, the fact remains widespread use of steel has not been accepted by the American public.

Continuance of active shipyard consumption, probably an increase, is indicated for this year. Warship construction will be heavier, while replacement of ships and a start in rebuilding a merchant marine looms. Public work, from which the steel fabricators are likely to benefit most, will involve bridges and grade crossing eliminations, the latter being urgently needed in many sections. New York has sold $10,000,000 of grade crossing bonds for an early start.

New York city and adjoining area is the heaviest

Value of Construction Contracts

37 States; in dollars; 000 omitted

(F. W. Dodge Corp. Reports)

	Total*	Residential	Commercial	Industrial	Public w'ks and utilities
1925	6,006,426	2,747,729	872,443	326,613	1,065,947
1926	6,380,914	2,671,120	920,890	471,249	1,340,351
1927	6,303,055	2,573,316	932,911	375,910	1,381,973
1928	6,628,286	2,788,317	884,609	508,840	1,464,480
1929	5,750,790	1,915,727	929,188	545,861	1,458,992
5-year av.	6,213,894	2,539,242	908,008	445,695	1,342,349
1930	4,523,114	1,101,312	628,809	256,632	1,651,238
1931	3,092,849	811,388	311,105	116,157	1,171,115
1932	1,351,158	280,067	122,718	43,490	590,301
1933	1,255,708	249,262	99,371	127,517	602,722
1934	1,543,101	248,840	150,595	116,078	751,236
5-year av.	2,391,698	538,174	260,023	131,975	953,322
1935	1,844,544	478,843	164,479	108,858	690,213
1936	2,675,295	801,624	249,136	198,019	920,412
1937 (9 mos.)	2,910,000	937,000	310,000	323,000	865,000

*Includes public buildings and all types of institutional buildings not separately shown in this table.

consumer of structural steel in the country. Due to the World fair opening in 1939, the next 12 months will result in a heavy demand as the bulk of building for the project will be done this year. It is impossible to estimate total requirements, but from 75,000 to 100,000 tons is generally estimated.

For buildings to be erected by the Fair organization proper, American Bridge Co., Pittsburgh, has the contract for fabrication and erection. Structures to be erected by exhibitors will be let separately through general contractors. A heavy school construction program is also practically assured New York with further extension of the elevated highway, tunnels and other heavy engineering, pointing to a reasonably close-to-normal volume for public work. In some recent years subway building has taken an average of 200,000 tons annually, but for several years this volume has slumped. Not much improvement from this source is expected in the near future.

In the West close to 79,000 tons of construction steel will be purchased by the government through the bureau of reclamation, for completion of the Grand Coulee dam and power plant, Washington. This tonnage probably will be the largest for any single project and first bids close Jan. 6, on 8000 tons, mainly plates for penstocks. Other steel requirements in the new contract include 25,000 tons, reinforcing bars; 25,000 tons, gates and operating devices; 5000 tons, pipe and fittings; 12,000 tons, trashrack metal work; 4000 tons, cranes and miscellaneous metal work. The successful contractor for this work will be allowed 1460 calendar days for its completion. The Grand Coulee project was started in 1934. Under the new contract 60 full train loads of steel and machinery will be required.

With December estimated, fabricated structural steel bookings for 1937 approximate 1,550,000 tons, a slight loss from the 1936 total of 1,609,016 tons. It is possible, however, that final and revised figures will bring the two years closer in bookings.

Heavy Shipments Bring Fabrication Decline

Shipments in 1937 were heavier, resulting in a decline in the tonnage available for fabrication at the start of the year. August was the banner month for shipments, 166,095 tons of fabricated material leaving the shops. Except for June, shipments were higher every month during the first three quarters than during the same period in 1936. The decline in bookings was sharply registered in October when contracts were taken for but 46,912 tons, those for September being 132,432 tons. Until October, bookings topped incoming business of 1936 for every month except February, May and July. Taking the 1928-31 period as normal, both bookings and shipments were well below those years.

During the year, the steel industry was a liberal consumer of its own product, and, with encouraging industrial plant expansion during the first half, more than made up the slack which developed in public buildings. Until mid-summer this situation prevailed, but during the last four months new private industrial and commercial requirements slid off materially.

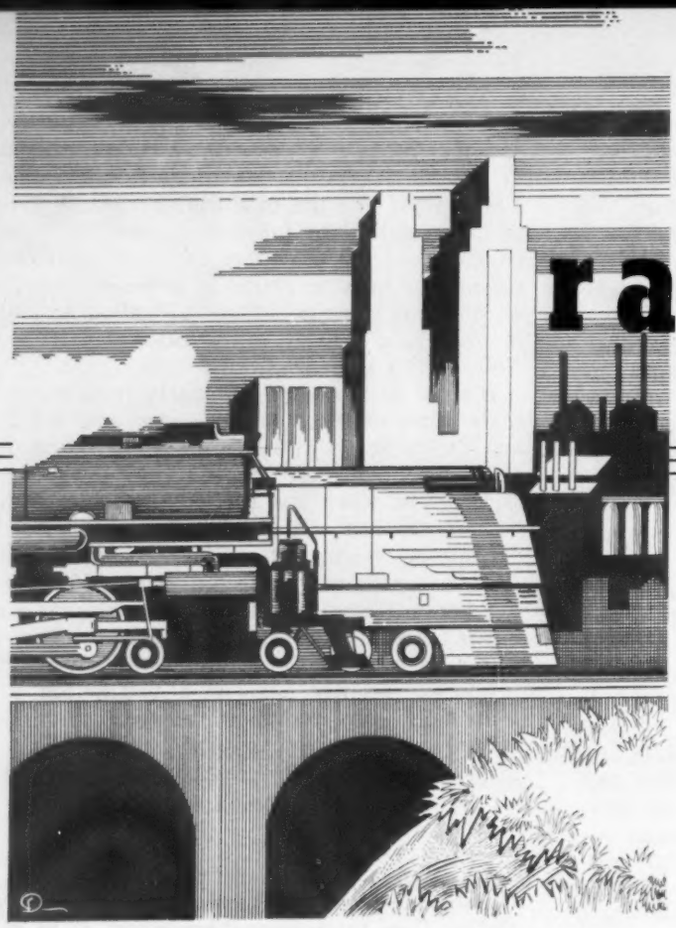
There has been, until recently, actually more building than is indicated by the bare announcement of the total number of tons booked. The type of work changed, with fewer large-tonnage projects and an increase in smaller lots ranging from 400 to 800 tons. There were more jobs for the tonnage placed than was the case the previous year. Lighter sections and more fabrication per ton was another development. The calibre of needs also operated to benefit the smaller shops in some districts, although strikes and labor squabbles prevailed at many shops in this class, notably in the Boston district, northern New Jersey and St. Louis.

Higher labor costs are largely responsible for estimated low profits. Fabricating and erecting costs are the highest in history. Few fabricators have fully reflected these increases in the prices quoted on steel in place and the industry is still absorbing a part of this additional burden. The industry is still prone to stress tonnage.

With a capacity of around 5,000,000 tons annually for heavy structurals alone, the price at which fabricated material is sold is too often out of line with sound economic operations. One large Pittsburgh producer recently suspended production of heavier material. A prominent eastern warehouse also dropped heavier structural fabricating. Another large producer in the East has developed a growing

(*Please turn to Page* 373)

Construction work is going forward rapidly on the Golden Gate International exposition, to be held in 1939 on a 400-acre man-made island in San Francisco bay. In proportion to its size compared with the 1939 New York World's fair, which will require between 75,000 and 100,000 tons of steel, the West coast exposition should take about 35,000 tons of steel



railroads

■ WAGE advances, higher taxes and rising prices of materials and supplies balked recovery for the railroads last year and arrested what had started to become a comprehensive program of equipment rehabilitation.

Increasing cost of operations alone was not responsible for the distress of the carriers when they went to Washington in November to seek higher freight rates from the interstate commerce commission. Waning industrial activity, with a consequent reduction in freight traffic during latter months of 1937, also contributed to poor earnings and to an abrupt curtailment in employment and spending.

Nevertheless, it was the rise in operating costs that gave the roads the sharpest blow and, by the same token, provided them with the strongest argument to support their plea for higher rates.

Railroad earnings were fairly well sustained during the first half of 1937, each month showing a gain in net operating income compared with the corresponding period of 1936 and 1935. In July, earnings slipped below the 1936 level, and the decline was accelerated during succeeding months. It was not until November, however, that cumulative operating income for the year dropped below that of 1936.

The first pinch to railroad earnings in 1937 was delivered by the expiration on Dec. 31, 1936, of the emergency surcharge, a $120,000,000 item, on the basis of 1936 revenue. Rising prices of raw and finished materials meant additional operating costs, estimated at $125,000,000 for the year.

Along came labor with requests for better wages. These were granted to the tune of nearly $135,000,000. Taxes incident to new laws were placed at $50,000,000 above 1936. The sum of these items, in the face of the second half lag in traffic, caused railroad officials to inaugurate economy programs. Purchases were restricted to bare necessities, and quiescence supplanted the boom of earlier months in steel for railroad use.

Some relief was afforded by the granting, in October, of higher rates on basic commodities, but the increase amounted to less than $50,000,000 on a yearly basis. In the opinion of railroad executives, the way to better profits in 1938 lies not alone through additional traffic but primarily by means of better revenue per ton-mile. Average revenue in the first half of 1937 was 0.936 cents per ton-mile of freight. In 1936 it was 0.974 cents; in 1929 it was 1.076, and in 1921 it was 1.275. The attempt in the latest rate petition has been to restore this unit revenue to the 1929-30 level.

It was stated freely at the recent rate hearing that the railroads not only need new equipment but that the restoration of their credit through higher charges and adequate earnings will be followed promptly by a sharp increase in expenditures for necessary freight cars, locomotives, etc. Purchase of 100,000 new freight cars annually for the next 20 years and 2000 freight locomotives in each of the next several years was cited as a not unlikely development.

There is no question that the roads need new rolling stock; whether they are able to buy it as rapidly as is hoped for is another matter. The fact remains, however, that more than 43 per cent of existing freight cars are 20 years of age or older and their obsolescence has been hastened further by the recent development of the more economical light-weight unit. Only 18 per cent of available cars are less than ten years old. The total number of cars in the service of Class I lines

is about 1,800,000; ten years ago it was nearly 2,300,000. Only the failure of freight traffic to reach its anticipated peak prevented a shortage of cars last fall.

Motive power also requires rehabilitation. More than 64 per cent of the railroads' locomotives are 20 years or more of age and only 7 per cent are less than ten years old. The supply of locomtives has dropped from 60,000 to less than 44,000 during the past ten years.

Obviously, the steel industry stands to profit considerably through the carrying out of proposed improvement programs. A taste of the demand for steel required for such work was provided during part of last year when car builders and railroad shops experienced their best activity since before the depression. While freight car orders in 1937 failed to top the 1936 total of 65,000 units, actual car building was greater because construction of many of the units placed late the year before did not get under way until early in 1937. Equipment business was the best since 1929 in spite of the second half slump.

Box cars constituted 32 per cent of the freight car orders received by builders the first 11 months of 1937. Hopper cars were 27 per cent of the total, gondolas 17 per cent, automobile cars 9 per cent and ballast cars 6 per cent.

Rail production also increased last year, output for the first nine months totaling 1,105,176 tons, against 867,989 tons in the corresponding 1936 period and 1,185,176 tons in all of 1936. Output was the largest since 1930. Noteworthy in rail business last year was the growing popularity of rails processed by special heat treatment. Facilities of some steel companies for production of this type of rail for a time were inadequate to meet the demand.

While 1937 was not productive of as much business from railroads for equipment as was anticipated, it was outstanding in engineering developments identified with freight and passenger car design and application of materials. Of particular importance to the steel industry was the increased consumption of high-tensile low-alloy steel, which, from the combined standpoint of weight, strength, and economy, has firmly intrenched itself as a desirable material for freight car building.

As an example of the progress made in weight reduction, Pullman-Standard Car Mfg. Co., Chicago, last year built an all-welded 50-ton box car, employing high-tensile low-alloy steel. The car weighs 35,300 pounds, or 10,000 pounds less than the standard A. A. R. unit. A few weeks ago the Association of American Railroads issued a test report on this car, stating that stresses, in proportion to yield point, were much lower than in the A. A. R. car at practically all speeds of impact.

This saving in weight is a matter of dollars to the railroads. If the carriers were able to replace all of their existing freight cars with units weighing one-fourth less, there would be an annual saving of $125,000,000 per year in cost of handling of cars, it is conservatively estimated. Naturally this change-over must be a gradual development, but a start has been made in that direction.

The fact that initial cost of the light-weight car has been brought to a level comparable with that of the heavier unit, despite the higher unit price of the material involved, adds further attractiveness to the new equipment.

Car builders are making greater use of welding as an aid to low cost production of light weight freight and passenger cars. Pullman-Standard Car Mfg. Co. has made extensive installations of equipment that will permit it to build welded box cars on a production basis.

The most remarkable development in railroad equipment recently has been in passenger trains. Probably

Santa Fe's "Super Chief"—diesel powered, with stainless steel cars—connects Chicago and Los Angeles in less than 40 hours. Ten years ago the best trains required 63 hours

no other period in the history of the railroads has been so productive of new types of passenger cars and locomotives as has the past four years. Light-weight streamlined trains no longer are an experiment; the passenger who waits until the last minute to obtain accommodations on such trains can attest to this fact. Making of reservations four to six weeks before date of departure is not unusual.

Profits accruing to the railroads from operation of the new streamliners have been gratifying and have prompted the installation of additional units. Light-weight trains now in operation or on order for early delivery number 55, comprising 484 cars. Additional cars of similar type, used either in solid trains or mixed with conventional cars, bring the total number of light-weight passenger cars built or on order to 1067.

High-tensile low-alloy steel and stainless steel have played a prominent part the past few years in passenger car building. The former metal was not available when the first streamliners made their appearance in 1934, but since that time about 700 main line passenger cars have been built of it.

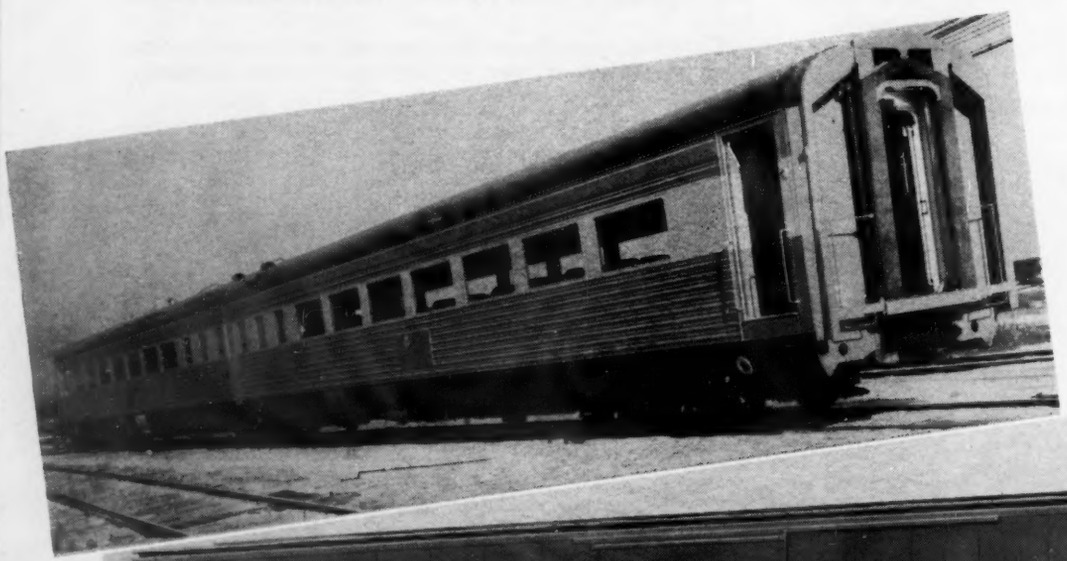
Aluminum, high-tensile low-alloy steel and stainless steel each has a special advantage in railroad car building and each has been used extensively. Aluminum is the lightest metal but is more expensive than high-tensile low-alloy steel. Stainless steel has the highest tensile strength of the three but is heavier than aluminum and more expensive than aluminum or high-tensile low-alloy steel. The latter has a price advantage over aluminum and stainless but is heavier than aluminum. High-tensile low-alloy steel's moderate cost, which accompanies satisfactory physical characteristics, has been a big factor in popularizing it.

Car-builders point out that they have about reached their limit in reducing the weight of cars through the use of new materials and new designs. Savings made thus far have been confined largely to the car shell, made up of the underframe, sides, end and roof. This portion of the older type cars weighs about one-third of the total. From one-sixth to one-fifth of the total weight of the car can be saved by using aluminum, high-tensile low-alloy steel or stainless steel.

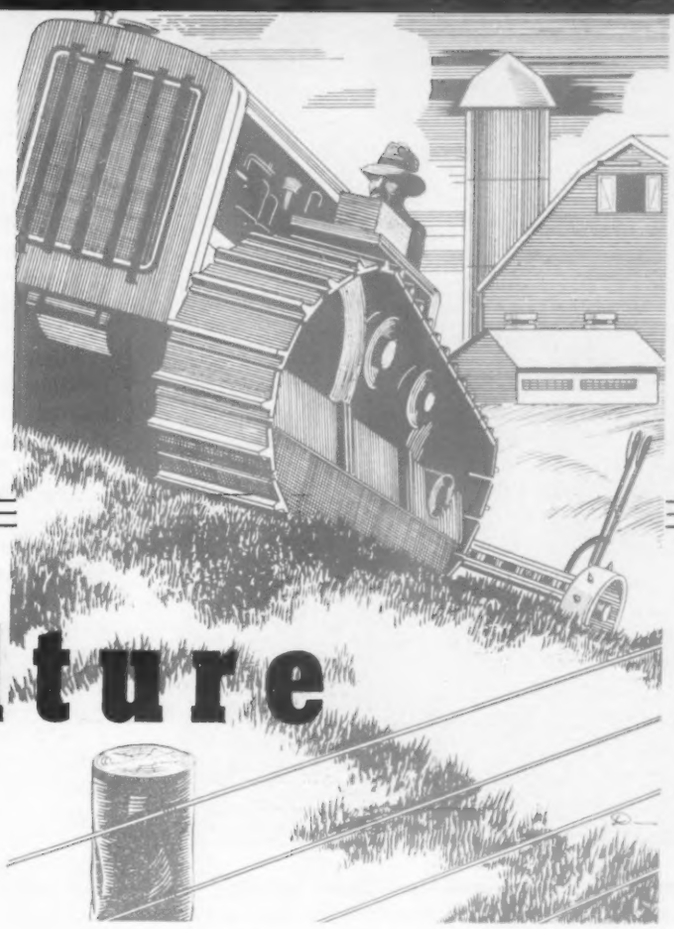
The most important problem affecting car design and construction that is before the railroads today is standardization, according to E. W. Test, assistant to the president, Pullman-Standard Car Mfg. Co. He cites the fact that car builders are now equipped for mass production, which promotes economy, but that the full value of this equipment and these economical production methods are not obtainable because of lack of standardization in railway equipment.

While the steam locomotive continues supreme as motive power for freight transportation, except in switching service, the diesel-electric engine is offering stiff competition in the passenger field. Among the largest diesel units installed on passenger trains last year were 3600-horsepower locomotives built by Electro-Motive Corp., LaGrange, Ill., for the Santa Fe and Baltimore & Ohio railroads. Each consists of two power units coupled together. Each unit contains two 900-horsepower diesel-electric power plants.

The Chicago & North Western and Union Pacific railroads jointly introduced the largest streamlined train to be installed by railroads of this country. This train consists of 17 cars and is powered by a 5400-horsepower diesel-electric locomotive capable of developing speeds in excess of 110 miles an hour. The train will operate between Los Angeles and Chicago on a regular schedule of 39¾ hours.



Day coaches built for Southern Pa by Pullman-Standard Car Mfg. Co. the articulated type, they are buil high-tensile, low-alloy steel, with st less steel exteriors. Below, high-te low-alloy steel permits building of box car with a saving of 10,000 pou in weight, compared to a stand American Association of Railroads s and at comparable cost and supe strength



agriculture

■ THE farmer came into his own last year. Nature was kind to him and crop production was 40 per cent larger than in 1936. Absence of large crop surpluses and better demand from consumers permitted the maintenance of fairly satisfactory prices. Result: Nearly a billion dollars more cash income than the year before and a real farm buying power exceeding that of 1929.

Cash farm income in 1937 was about $8,700,000,000. While this is a decrease of 17 per cent from 1929, actual buying power last year was boosted by the lower prices for goods farmers buy as well as by lower taxes and interest charges compared with those of 1929.

Prices farmers paid for commodities necessary to conduct their business averaged about 14 per cent less in 1937 than in 1929. The saving on interest charges was nearly $300,000,000, taxes were $200,000,000 lower, while rents paid to nonfarmer landlords and wages to hired farm labor represented several hundred million dollars less than was spent for the same purposes eight years before.

Income of agriculture has been rising since the middle of 1933, when the low point of the depression was reached. Last year marked the recovery of the remaining ground lost by farm buying power between 1929 and 1933 and constituted one of the principal reasons for the high rate of general industrial activity during the major portion of 1937.

Farmers are liberal spenders under favorable earnings conditions. This has been demonstrated the past two years when an opportunity was provided to compensate for the postponement of buying of both necessities and luxuries during the depression. At the bottom of the slump, department store sales and rural retail sales of general merchandise were on a par at less than 60 per cent of the 1929-31 average, according to department of commerce figures. Last year, business of rural stores soared above 130 per cent of the index, while department store sales, although rising, failed to top 100 per cent.

Better farm income also spelled prosperity for farm equipment manufacturers. While actual figures are not available, it is estimated that 1937 wholesale domestic sales were nearly 25 per cent ahead of the 1936 volume of $409,090,155, or a total for last year of more than one-half billion dollars. Comparing this with 1929 sales of $458,000,000 and with the previous peak of $471,000,000 in 1920, it is evident why equipment plants were rushed for months to keep up with demand and why they were one of the steel industry's best customers. Payrolls touched an all-time peak in midsummer.

Export trade also increased sharply, being estimated on the basis of reports for the first ten months at about $75,000,000, compared with $43,993,899 in 1936. Sales for export in 1929, however, were over $112,000,000.

Outstanding in equipment markets last year was the continued heavy demand for tractors. Despite attempts of manufacturers to increase their output through plant improvements and extensions, production for a long period lagged behind sales. Additional capacity now is available to accommodate still heavier demand than the record-breaking business of the past two years.

The tractor dates its usefulness on the farm back to 1906, and in point of age is a relative newcomer, yet in dollar volume it is the most important divi-

Tractors and tractor-operated machinery account for more than one-half the total business of the farm equipment industry. Photo courtesy Allis-Chalmers Mfg. Co.

sion of the farm equipment industry. Fifteen years ago tractor sales represented less than 25 per cent of total domestic farm equipment sales. By 1935 they had exceeded 40 per cent and now more than one-half the industry's business is made up of tractors and equipment that derives its operating power from tractors.

To the all-purpose type of tractor, introduced in 1923, goes the popularity crown. Since 1931 this variety has increased its percentage of total tractor sales from 33.3 per cent to more than 75 per cent. Another factor in boosting tractor use has been the development of the small tractor which is finding application not only on farms of limited acreage but also on larger farms as an auxiliary unit. Many of the 2,700,000 farms of less than 50 acres have found economical use of the small tractor whereas before its introduction an investment in the higher price machines then available was not justified.

It is interesting to note the rising popularity of rubber tires for use on tractors. Percentage of wheel type tractors so equipped increased from 14 per cent in 1935 to 31 per cent in 1936, with a further gain shown for 1937.

The bureau of census reported 505,933 tractors on farms in 1925 and 920,021 in 1930. While these are the last government compilations, private estimates place the current number at approximately 1,500,000 and their average age at more than 7 years. On this basis the tractor industry has prospects of a substantial replacement market during future years.

In this connection, the steady decline in number of horses and mules on farms in the United States is a natural development. Since the 1919 peak of 26,436,000 head there has been a decline of about 40 per cent.

Small combines contributed substantially to total business last year in the farm equipment industry's important harvesting machinery division. Like the tractor, the combine market has been enlarged by the development of the small size unit. Large crops stimulated demand for harvesting equipment. Corn pickers moved well as a bumper crop developed. In the Middle West the corn crop was double that of 1936.

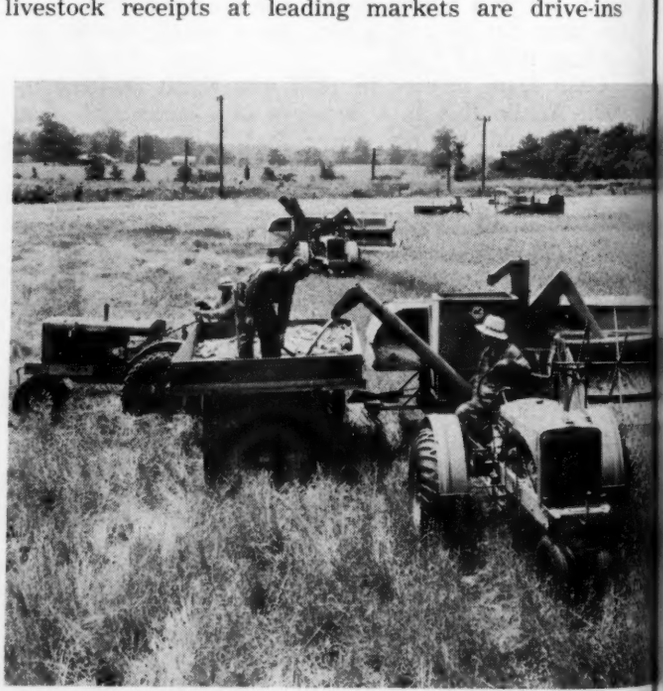
Farm income last year was distributed more evenly than in the several preceding years when droughts ruined crops in various localities. Cotton growing states, however, suffered from the low price of that commodity despite a much larger crop than in 1936.

The mechanical cotton picker, subject of much discussion a short time ago because of its probable effect on southern labor, continues in the experimental stage, but some designs are near the point where they can be put in commercial manufacture. Farm implement manufacturers do not anticipate a huge market immediately for the mechanical picker but see possibilities of its eventually developing into an important branch of the industry.

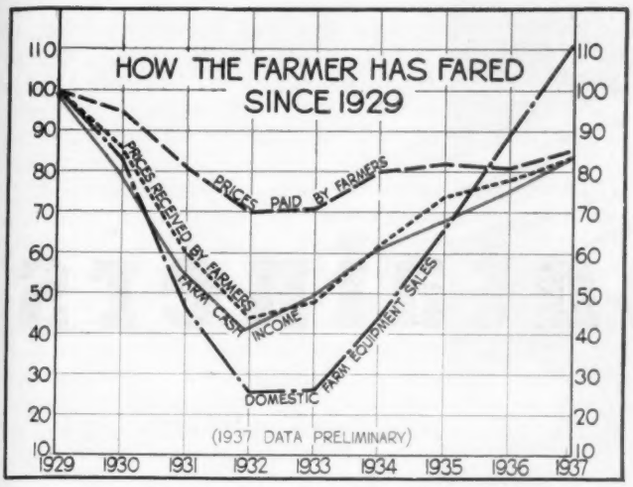
Whether this equipment has widespread use in the South during the next generation, however, depends upon whether the cotton growing section of the country wants such a machine, according to Sydney G. McAllister, president, International Harvester Co. He expresses the belief that the introduction of the mechanical cotton picker into the South will come about gradually and naturally, and that for this reason the economic changes resulting from it will produce a minimum of social disruption.

Although ordinarily not considered a farm implement, the motor truck is playing an increasingly important role in farm operation, and last year farmers were among the leading buyers of such equipment. One of the important uses of trucks by agriculture is in hauling livestock to market.

Figures compiled by the federal bureau of agricultural economics show that lately 55 per cent of total livestock receipts at leading markets are drive-ins



A modern harvest scene, with Allis-Chalmers Mfg. Co. model "WC" tractors and all-crop harvesters. Tractors and small combines continued among the farm equipment industry's best sellers in 1937



by motor truck. Twenty years ago the proportion was less than 2 per cent. At some markets more than 95 per cent of the receipts are truck-driven. Hauling of milk, perishable truck and fruit crops also has been greatly facilitated by widespread use of motor trucks.

Farm electrification continued to increase last year, adding more than 200,000 to the 1,000,000 farms previously receiving current from power lines. Since the number receiving service still represent less than 20 per cent of all farms with occupied dwellings, a large market for electricity and electrical equipment remains to be developed.

A survey by the Committee on the Relation of Electricity to Agriculture shows that on typical farms in Wisconsin about 90 per cent of the connected electricity load is for household uses, lighting and pumping, the remainder being for productive purposes on the farm. On these same farms, the percentages having various electrical equipment were as follows: radio, 93 per cent; iron, 88 per cent; washing machine, 88 per cent; range, 21 per cent; and refrigerator, 21 per cent.

Business in merchant wire products has responded to the better income of agriculture, and, during the past two years, also has been stimulated by the deferred maintenance that accumulated during the depression. Recent improvements in galvanizing practice, resulting in a longer-lived product, likewise have helped sales of wire fence and barbed wire.

Steel is finding new applications not only in the repairing of farm structures but also in new buildings. Galvanized sheets long have been recognized a valuable aid in fire prevention but on occasions have suffered in competition with composition roofing because of higher cost.

A recent trend in barn construction has been to reduce it to one-story in size and to provide a separate structure for hay storage. This removes from the barn itself the fire hazard incident to storing hay in the loft where spontaneous ignition may occur without warning.

The individual hay container is shaped like a silo and has its outer wall covered with galvanized steel sheets. Inside there is a lining of louvred sheets. An opening between the studdings at the base of the wall permits ventilation through the flue provided by this construction. Adoption of the all-steel barn has been relatively slow, but development of new light structural members, new methods of fabrication and new combinations of steel with other building materials in connection with residence construction is expected to be equally adaptable to farm structures, with a consequent expansion in agricultural use of building steel.

Equipment Makers Are Moderately Optimistic

While not unmindful of the fourth-quarter slump in general business activity, farm equipment manufacturers are inclined to be moderately optimistic regarding the 1938 outlook. Past experience has shown that farm income is the best guide to probable equipment sales. Unless the current industrial setback is prolonged, the effect on agricultural purchasing power is expected to be small, hence an abrupt curtailment in implement and tractor buying in 1938 is not regarded as likely.

Contracting by dealers last quarter was reported as satisfactory, though the industry doubts that farm income or equipment sales of 1937 will be exceeded during the coming year. The downward trend in prices of farm products late last year was an unfavorable factor and if continued will affect the 1938 outlook adversely.

Larger government payments are looked for in 1938, principally because of the cotton bounty. Soil conservation payments are expected to be about the same. Government payments the first ten months of 1937 totaled $355,000,000, against $232,000,000 in the corresponding 1936 period, an increase of approximately 53 per cent.

International Harvester Co.'s cotton picker

containers

■ DESPITE a somewhat sharp decline in demand the last quarter, tin plate production in 1937 established another tonnage record and reflected the growing use of containers in a steadily broadening consumer market.

Averaging a higher percentage of operations than the steel industry as a whole, tin plate output approximated slightly more than 80 per cent of capacity, which is now estimated at close to 3,000,000 gross tons annually. This increase followed a record-breaking output in 1936 when the industry operated at 79.4 per cent, producing 2,108,916 tons.

During the year tin plate capacity for the country was increased by several hundred thousand tons, the increase being largely devoted to cold reduced tin plate equipment, there being little if any expansion in hot rolled tin plate mills.

While final statistics on production for last year are not yet available, in round figures it is estimated close to 53,000,000 base boxes from about 2,382,400 tons. The ratio of tin plate produced indicates this branch of the steel industry contributed slightly better than 7.5 per cent of the total. The increase in tin plate capacity accounts for the seemingly light percentage of operation ratio to the larger tonnage produced.

The growth in tin plate demand is further seen when compared with 1935 when about 39,000,000 boxes were rolled, 1934, with 32,000,000 boxes and 1933, with 34,000,000. Reduced to tonnage, the demand in 1935 was 1,900,000 tons, and in 1934 about 1,600,000 tons.

Of the total tonnage of steel produced in 1935 about 8.5 per cent went into tin plate while in 1934 the ratio was 8.6. In 1933 the ratio was 12.2 per cent. In lean years the percentage of tin plate consumed or produced is greater in proportion to the industry as a whole than in busy periods. This axiom, while in general holding for last year, is less sharply apparent, although the improvement in other lines naturally brought up tonnage in those fields. Production of tin plate by quarters, 1937, follows:

	Tons	Per Cent of Capacity	Exports, Tons
First quarter	585,075	81.2	86,348
Second quarter	673,792	92.2	100,762
Third quarter	687,756	92.9	81,973
Nine months	1,941,726	87.4	269,083

Had not the rate of operations in the last quarter gradually declined to less than 60 per cent of capacity the showing would have been much more impressive. Exports were well above the 289,678 tons of the entire year 1936.

While tin plate was advanced 50 cents a base box during the year, more than 90 per cent of material produced sold at $4.85 a box, Pittsburgh. Not until well in the fourth quarter did the $5.35 price apply on much outgoing tonnage.

The brisk export volume was generally done at full or premium prices. Heavy domestic shipments

Three Major Vegetable Packs

(Unit: 1,000,000 cases)

	1937	1936	1935	1934	1933	1932	1931	1930
Tomatoes	20.5	24.0	15.7	13.1	12.0	16.0	9.6	10.0
Peas	23.3	16.0	24.6	15.7	12.9	10.4	13.3	22.0
Corn ...	24.3	14.0	21.0	11.3	10.2	9.4	19.4	15.7

at the lower price, however, were greater than expected and many consumers started this year with sizable stocks. The likelihood of price advances appears to be slight for the greater part of the year, $5.35 having been reaffirmed for a nine-month period.

The steel strike at some centers in June seriously disrupted operations and shipments of several large producers, and a tense situation prevailed with extreme activity until well into August when backlogs were lowered and demand slumped. By Sept. 30 old contracts were completed at the lower price, most consumers having covered well through the last quarter. A mild flurry about Nov. 15 at the higher price resulted in needs for some southern canning. During the first five months some premium prices were paid by export consumers, $10 per ton in certain instances. In effect the higher price brought the domestic quotation about in line with export and there has been no apparent price weakness for months.

The reaffirming of prices for a nine-month period is pleasing to canmakers, the prices on packers' cans being made, if possible, to cover the entire packing season. In view of impending freight rate advances, however, delivered prices are expected to be higher. Tin prices tend to vary widely in a sensitive market. Pig-tin has fluctuated erratically for several months.

Tin plate stocks held by producers are about normal. At one time mills had close to 5,000,000 boxes in stock, material specified, but not released for shipment. Before the new year any excess of such stock had been moved, although some mill stocks are always available.

Canmakers Develop New Uses

Canmakers have been active developers of new markets. To the makers of cans goes the credit for canned beer, rather than to the brewers. The latter were skeptical and had to be sold. In two years, while not attaining the heights first predicted as a consumer of tin plate, the canned beer trade is making substantial and steady progress.

Cans required for beer in 1937 are estimated at 805,000,000, or more than 2,000,000 boxes of tin plate. This is a notable showing to be made in less than two years, especially as early production and sales efforts were devoted largely to experimenting.

An increase of 15 per cent was recorded in canned beer sales last year and close to 80 per cent of packaged beer exported was in cans. The American Can Co. has sponsored a survey of beer consumption in American homes, the heads of 54,000 families being interviewed. It was found that 38.6 per cent of urban families drink beer at home and an additional 9.2 per cent away from home, or a total of 47.8 per cent. Data as to the percentage of families who drink beer at home was secured in 23 selected cities. Milwaukee and St. Louis lead, with approximately 60 per cent of the families in those cities buying beer for home consumption.

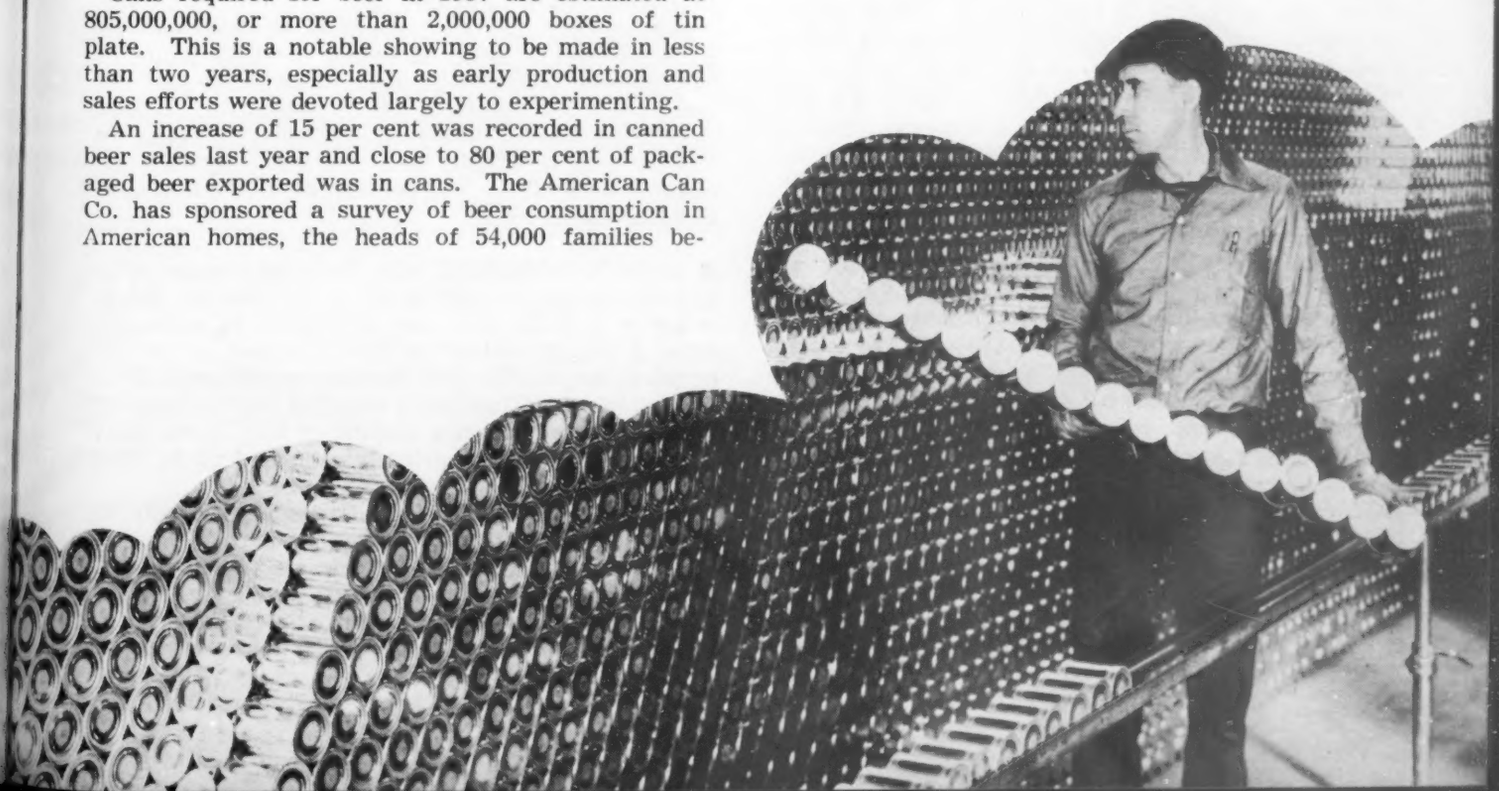
A brief part of the report devoted to trend of canned beer buying shows a healthy increase in the popularity of this form of packaged beer. In May, 1936, 18.9 per cent of families buying beer for home consumption bought canned beer. A year later this proportion had increased to 23.6 per cent, or a 25 per cent gain in canned beer purchasers. The September, 1937, survey revealed a further increase of 10 per cent in families preferring their beer in this metal container. The May, 1937, survey showed that of the families buying beer for home use in Boston 57 per cent were buying in cans and in New York city the proportion was 37 per cent. During the 12-month period ending May, 1937, the number of families buying canned beer had increased 43 per cent in Boston and 48 per cent in New York. while actual case sales in New York gained 75 per cent in the same 12 months.

With evaporated milk still leading as the largest outlet, the vegetable pack, notably of corn, was materially heavier during the last 12 months. Close to 67,000,000 cases of milk were sealed and marketed in cans.

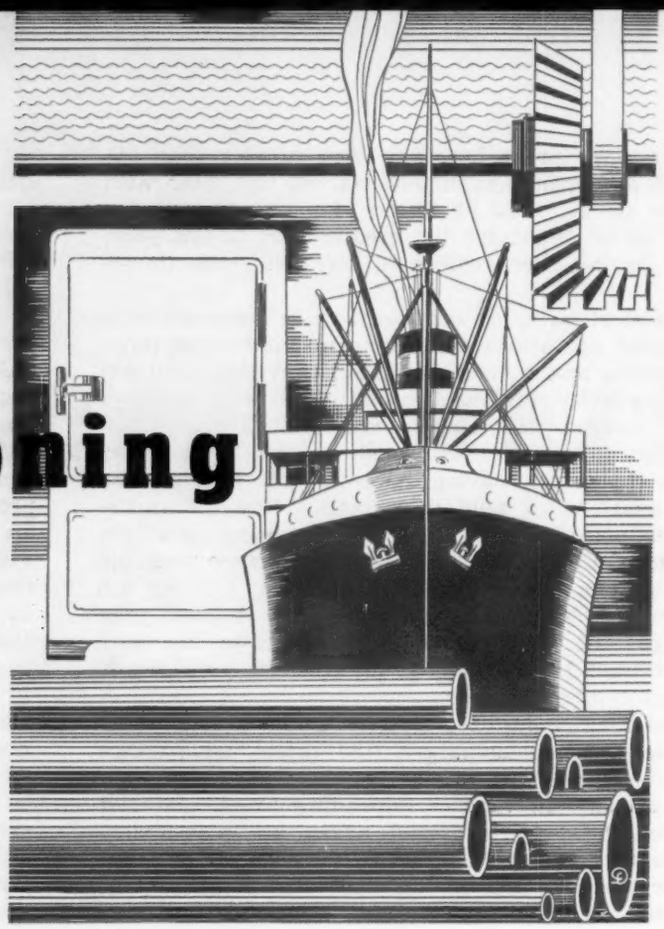
Usually second in the list, tomatos fell to 20,500,000 cases from 24,000,000 cases the previous year. Failure of the crop in some areas was responsible, rather than any drop in demand.

The oil industry, about third, improved its consumption of tin plate, oil being marketed in one-quart containers at a ratio of 15 to 1 as compared with larger capacity units.

The fish industry held its position as a major consumer with a slight increase. Pineapple juice surpassed the fruit itself for the first time. The cranberry crop, unusually large in Massachusetts, consumed close to 1,000,000 cases.



appliances pipe lines air conditioning machinery export



■ LOOKING back on 1937 as a record year in every household appliance line, iron and steel producers may expect a continuation of heavy demand from manufacturers of this equipment. New uses for steel in the home have been found and older applications extended as better steels for these purposes have been developed. Steelmakers have augmented capacities for rolling the lighter steels required for appliances.

Sales of most household appliances in 1937 were 40 per cent more than in 1936. Despite this, however, the middle-class market has not yet reached the saturation point. Replacements, of course, will provide a fairly steady market even when the supply nears this mythical point.

Many household equipment manufacturers are looking forward to a new wave of buying in the fall of 1938 and say there is no reason for anyone in the appliance business to be discouraged.

Rural electrification and an increasing supply of cheaper electricity have opened a rich new field for electric appliances while an extraordinary year for farmers has added a fillip to sales. Development of the administration's new home-building program may be expected to bolster sales not only in 1938 but for several years following.

Electric refrigerator manufacturers are estimated to have sold between 2,300,000 and 2,500,000 units in 1937, compared with 2,067,257 in 1936 and 1,570,383 in 1935. Each unit requires an average of 190 pounds of steel, providing a market for approximately 225,000 tons during the year. Leading producers' budgets for 1938 generally are based on sales of approximately 90 per cent of the 1937 volume, dependent of course on general business conditions and the trend of employment and wages.

Other electrical appliances showed similar gains. Electric range sales in the first nine months were 311,223 units, compared with 228,129 in the comparable period of 1936, an increase of 40 per cent.

Vacuum cleaner sales in the first three quarters were 1,338,437, compared with 1,072,669. Ironers gained from 136,413 to 147,683 and electric washers from 1,215,986 to 1,245,482.

Home furnishings and appliances in 1936 required 1,134,270 tons of steel, exceeding the 1929 figure of 927,713 tons, the previous high. Trend of the past ten years has been toward a higher percentage of total steel production for household appliances. In 1928 only 2.18 per cent, or 621,280 tons, was used. By 1930 appliances were taking 3.11 per cent of total output and by 1935, 4.24 per cent.

■ AIR-CONDITIONING sales last year presage little interruption of the past decade's progress. An infant industry in 1929 with only $9,500,000 in aggregate sales, it did $17,000,000 in 1930, slumped in the depression, got its first real upswing in 1935 with $35,000,000 sales. In 1936 sales were $53,000,000, a figure equalled in the first nine months of 1937. Total sales for the past year are variously estimated up to $85,000,000.

Although business in the past has been largely in commercial and industrial structures a trend toward air-conditioning plants for residential use is noted. Several manufacturers late in 1937 announced "packaged" units for homes costing from $5000 up.

Growth of air conditioning, incidentally, may force

sales of related equipment by necessitating that cities install greater sewerage and water facilities. Some communities, where such facilities are limited, already have found it necessary to limit air-conditioning installations. Manufacturers of this equipment are coping with the problem by offering evaporative condensers and cooling towers which reduce the amount of water required.

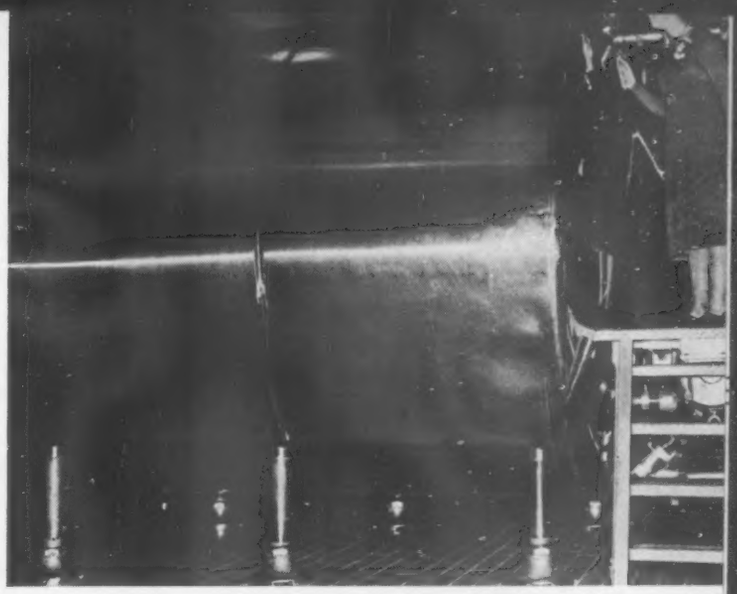
Mechanical coal stoker sales last year approximated 110,000, 27 per cent more than in 1936 and 130 per cent over 1935. Nearly 80 per cent of these were of small capacity, up to 60 pounds of coal an hour, suitable for homes. This size stoker requires between 100 and 150 pounds of steel, including alloy steel for transmissions and castings. A considerable tonnage of sheets is used in coal hoppers.

Approximately 10,000,000 buildings in the United States are adapted for automatic firing while only about 2,500,000 were so equipped at the end of 1937, leaving 7,500,000 buildings that represent excellent prospects for new stoker installations.

"Our members feel that 1938 will be a very successful year, providing general business conditions and government policies do not hamper too much," comments Marc G. Bluth, secretary, Stoker Manufacturers association, Chicago. "The first six months of each year are always the low months, but plans are being laid by most of our members to increase their sales in 1938 from 20 to 50 per cent ahead of 1937."

■ BUILDERS of machinery and equipment were hard put last year to supply a record demand for their products, estimated at 40 per cent above 1936. Steel demand from this source rose from 1,443,353 tons in 1936 to close to 2,000,000 tons.

Despite this accelerated output, further equipment programs in 1938 are necessary if the maximum of profits is to be realized. Higher costs of labor and materials are making greater efficiency in their handling essential.



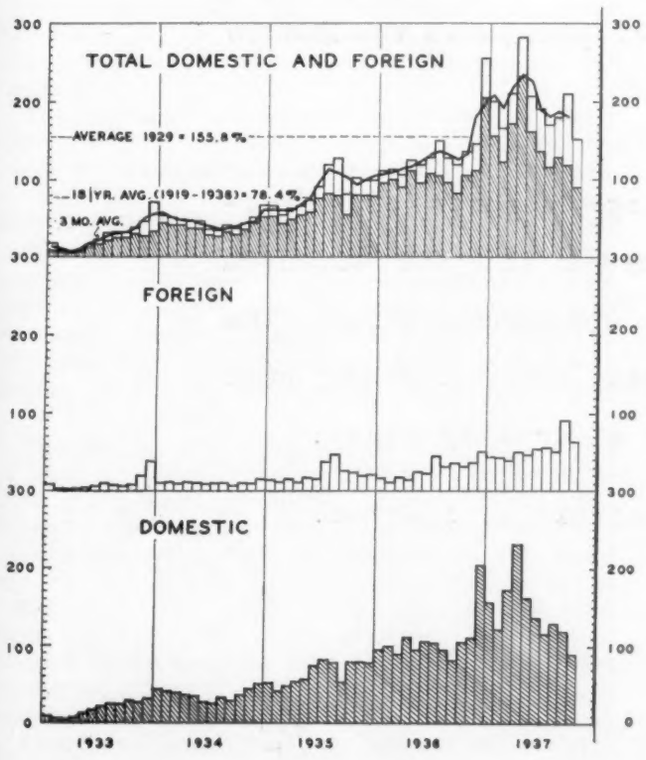
Fabricators of steel tanks last year provided a market for close to 430,000 tons. Stainless steel was used in this holding tank, one of four, in the new $2,500,000 plant of Sheffield Farms Co. Inc., Jamaica, N. Y.

The automotive industry, prevented from extensive retooling programs last year by high demand, labor difficulties and the consequent necessity for a short changeover period, is almost certain to provide a large market for tools and equipment in 1938 to prepare for more radical changes in design of 1939 models.

Machine tool sales in 1937, as indicated in the accompanying chart, exceeded 1936 sales by approximately 40 per cent. Foreign sales accounted for nearly 30 per cent of the total.

INDEX OF MACHINE TOOL ORDERS
DOMESTIC AND FOREIGN DESTINATIONS

1926 SHIPMENTS = 100%



■ BETWEEN 9000 and 10,000 miles of new pipelines were laid in 1937, compared with approximately 5500 miles in 1936. Demand for oil country goods was brisk throughout most of the year.

Despite the widening of the nation's network of pipelines, this form of transportation still is far from its fullest development. At the end of 1937, only 5,460,000 gallons of gasoline daily, less than 10 per cent of total consumption, were carried by pipelines. New wells must be drilled in 1938. A large amount of natural gas released by drilling of oil wells must be taken to consuming centers by pipelines or wasted.

Expansion of pipelines in 1938, will, of course, be determined by the attitude of governmental units and the facility with which financing can be arranged. Oil, gas and water requirements always are good for a considerable tonnage of steel. In 1936, 1,548,653 tons were used, 5.33 per cent of total output. Only during three years of the depression, 1933, 1934 and 1935, did this source take less than 5 per cent of aggregate steel production. With favorable conditions in 1938, requirements may approach the boom oil days of the early 1920's when between 10 and 15 per cent of all steel produced was used for oil, gas and water production and transportation.

■ UNITED STATES iron and steel exporters found

(*Please turn to Page 377*)

McLOUTH STEEL CORPORATION

Manufacturers of

ANNOUNCEMENT

As the New Year opens, McLouth Steel Corporation begins production of cold rolled strip steel, having broadened its facilities to include a modern cold rolling mill in addition to its hot rolling mill.

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The mills, annealing furnaces and electrical equipment incorporate all the advanced features of modern design and construction. The McLouth plant is a compact manufacturing unit assuring prompt delivery of quality steel.

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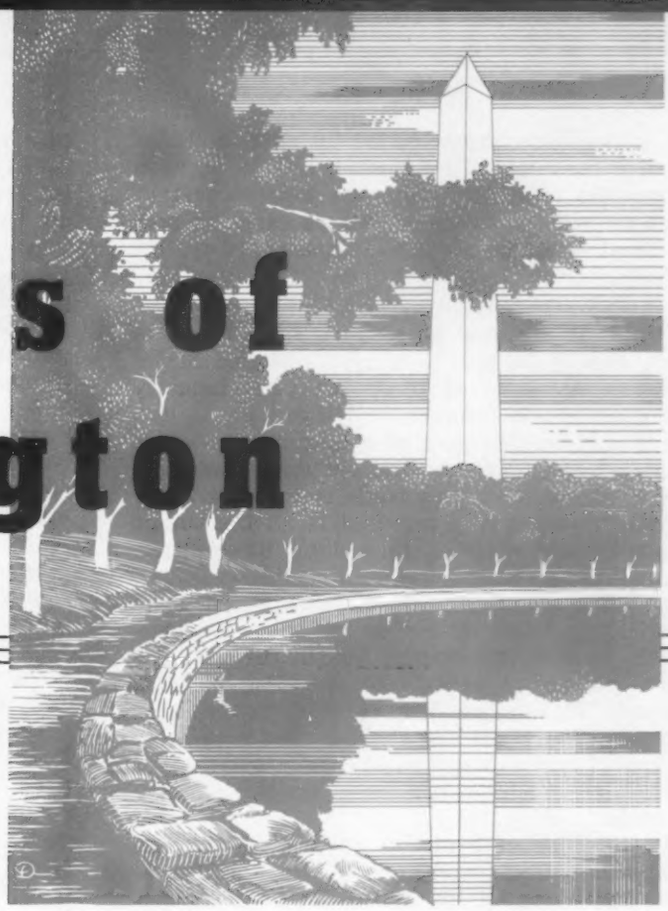
windows of washington



BY L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ TRYING to forecast what the administration and congress will do to or for the steel industry in 1938 is quite as impossible as to predict what Charlie McCarthy will say next. However, there are certain matters pending and certain trends which if studied may be considered as sign posts in the governmental traffic.

Things are moving more rapidly than usual at the nation's capital at the year-end, and therefore, barring a jam, many wheels will turn and much will happen.

The national labor relations board is being criticized from all sides. First by industry, because it considers the board has dealt unfairly with it, then by the CIO and the A. F. of L. because they consider the board has dealt unfairly with them.

The board and its employes, especially its examiners, always seem to be in hot water when hearings are in progress and the board itself has been repeatedly censured during the past few months. While members of the board have spoken in their own defense at various meetings, no one seems to take them very seriously.

The fact of the matter is that during the course of hearings where either the examiners or the members of the board are sitting, counsel for industrial interests are not given much of a show. It has frequently happened that the chairman of the board himself has practically ruled on a motion by an industrial lawyer before he has had time to complete his statement. There have been any number of such instances which have disgusted many of the industrial attorneys who have appeared in various cases.

Chairman Madden has felt that certain business firms have spread rumors about the work of the board and that is what has brought down all of the criticism on its collective head. But the true story is that newspaper men sitting in on some of the hearings in various parts of the country are at last echoing what Washington correspondents have said all along—and the echoes are still reverberating.

The railroad freight rate increase situation is still up to the interstate commerce commission. It will be recalled that during the past year, in fact during the past few months, the commission granted the railroads an increase in freight rates on certain commodities.

The commission now has pending before it a petition for a flat 15 per cent freight rate increase. Some hearings have already been held here in this case and others will be held later in other parts of the country. It is a good guess, after listening to the office gossip, that a decision probably will be handed down more quickly than in any other major case which has been handled by the commission for many years.

Quite naturally the steel industry is going to be interested in the decision, not only because of its own freight rates but because if the carriers get what they are asking or any part of it, it will probably mean that they will be in the market for a considerable amount of steel. If no increase is allowed it is likely that the roads will again go on the hand-to-mouth steel consumption diet which they have been following for such a long time. If the increase is granted it is believed that it will relieve the roads' revenues to such an extent that they will be back in the steel market in a big way.

Even if the commission wishes to make a quick decision in a case of this kind, and the story is that

it does, it is pretty much bound up with a lot of routine that has to be followed before a decision can be reached. Anyhow there are assurances that this decision will be handed down as early as possible. Final argument will be heard before the commission starting Jan. 17.

■ A NUMBER of trade agreements have been entered into during the past year by the United States government. In some of these the steel industry has had considerable interest.

There is a great difference of opinion on the whole trade agreement program. The old song about letting down the bars for free trade is sung by many high tariff advocates who feel that is all the United States government is doing in making these agreements.

On the other hand it must be remembered there was much log rolling going on in congress when the tariffs were being revised, under the old system, and this led to months of unending business uncertainty. This did not help industry in the least. While trade agreements are certainly not a panacea for all import and export ills they have not harmed the patient as much as had been anticipated even by the antis.

Right now the government is working on the very important trade agreements with the United Kingdom and changing the agreement with Canada. These two will have to be worked simultaneously because they are so closely allied. Also, it is possible when these have been concluded that other parts of the United Kingdom will enter into similar agreements which may help. For example, trade with Australia has not been what it used to be nor what it might be.

The story is rumored in Washington in connection with the United Kingdom negotiations, that they mean considerably more than a trade agreement.

There has been a great hue and cry from many sources recently for changes in the Sherman anti-trust law. This has come from the President and the attorney general as well as members of congress and others further down the government ladder.

The attorney general, who has been most insistent for changes in this law, has now cautioned against any hasty action, so there may not be any action at all during the third session of congress convening early in January.

The crux of the matter is, as suggested by observers here, that Mr. Cummings thoroughly sold the President on the idea of amendments to the present anti-trust law or possibly an entirely new law.

Mr. Cummings nas stated that he has had men working on proposed changes for a long time and that he has collected a great deal of data for congress. Data or no data the justice department has not yet drawn up any bill. From what the attorney general said at a recent press conference it is evident that he would rather make a present of this statistical data and his ideas to a committee of congress and not try and draft a bill himself.

It has been contended for a long time by the department of justice that it is next to impossible to get court action favorable to the government in an antitrust case, especially on criminal charges.

■ AT the time this is written it is impossible to say whether the January session of congress will take any action, even to the extent of hearings, in connection with the antibasing point bill introduced by Senator Burton Wheeler, chairman of the senate committee on interstate commerce.

It will be recalled by readers that a couple of years ago Senator Wheeler introduced this basing point bill and during that particular session hearings were held lasting some three weeks, at which leading representatives of the steel industry appeared in opposition to the bill.

As the result of those hearings the senator announced that he would introduce some amendments. Nevertheless he reintroduced the bill during the course of the first session of the present congress and no amendments were included. It stands now just as it did when first introduced.

Senator Wheeler is interested in a good many other things, principally the railroads, and it is doubtful if he is going to worry much about the basing point bill unless he is forced to by someone pulling the strings.

It is, of course, impossible to predict what congress is going to do about the many bills and resolutions which are pending in both houses with regard to export prohibitions, except under licenses issued by the government, of iron ore, pig iron, scrap, and finished iron and steel products. It is the intention of congress to hold hearings on this subject during January. Even if hearings are held it is a long lane with many turnings before you reach the passage of such an act. One thing, from a labor standpoint, that certainly helped the steel industry during the past year was the fight between John Lewis and William Green.

Because of the row between the two labor organizations, the White House has had to be very careful just what it did in the matter. If the talk that the President has made every effort to have the organizations reach an amicable agreement is true, then it is equally true that he has had little or no success.

McGrady Called In As Missionary

Edward F. McGrady, one-time labor trouble shooter for the administration and now doing the same kind of work for the RCA, is said to have conferred with the Chief Executive on this point and to have tried to do his bit. McGrady is a close personal friend of both of the labor leaders and he was in a good position to act as a go-between. But with the two chiefs engaged in calling each other names at every possible opportunity, McGrady did not get very far.

Every once in a while in Washington there are whisperings that some grand gesture will be made which will bring the two organizations together again. Unless a lot of bygones are forgotten, this is going to be almost impossible.

Millions of dollars were poured in last year as payments under the social security act. There is a great deal of controversy on this subject—and that's an understatement.

Much discussion was started over radio speeches by General Hugh S. Johnson, former head of NRA, who pointed out that these payments are not to be salted away by the government for future use, but the proceeds are being used for current governmental expenses. This little point had apparently been overlooked in most quarters.

Such a fuss was made over this issue that the

(*Please turn to Page* 375)

mirrors of motordom

BY A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ SAILING true to the course set for it last year at this time, the automobile industry in 1937 apparently reached what statisticians call a cyclical peak and, but for a relapse in November and December, would have scaled the 5,000,000 mark in assemblies.

With December production estimated, output of cars and trucks in this country and Canada last year totaled 4,968,000, a gain of some 7.6 per cent over the figure for 1936. Hence virtually a 5,000,000-car year goes down in the records, and only 1929 can show a better record.

Car production has been increasing yearly now since the low point of 1932, although the rate of acceleration has been slower each year as the crest was reached. Much of the credit for pulling industry in general out of the depression woods can be bestowed on automobiles. From the "prosperity" plateau of 1935, 1936 and 1937, what can be discerned for the future?

It appears inevitable that a slowing down must come before the industry can get its wind for the next climb. But how much? And for how long? Estimates of the probable decrease in production this year range from 10 to 30 per cent, with emphasis on the higher figure. It appears much more difficult to estimate a drop than to forecast the increases which have been registered the past few years.

Alfred P. Sloan Jr., chairman, General Motors Corp., in a number of public statements, has forecast a unit volume of production for this year 20 per cent below that of 1937, but, as a concomitant of higher retail prices, a dollar volume of automobile business only 15 per cent below 1937.

To arrive at some tangible figures, assume this year will miss last year's total by 25 per cent. Then the market may be broken down as follows:

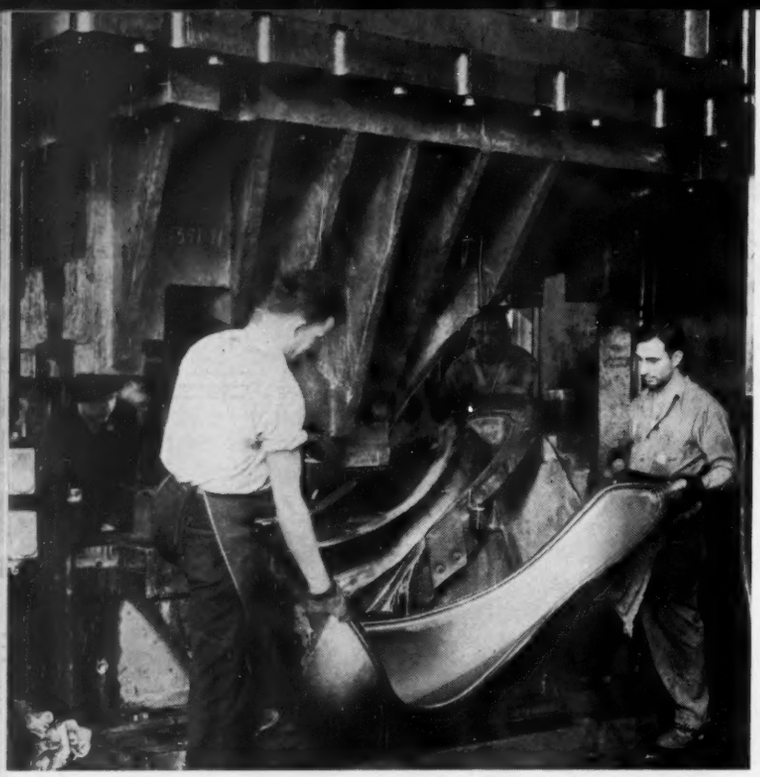
	United States	Canada	Export
Passenger cars	2,338,000	68,000	400,000
Trucks	700,000	20,000	200,000

These estimates realize export demand probably will continue strong throughout the year, as well as demand for trucks and commercial cars. The sharp drop will come in passenger cars bought in this country.

■ LOOKING beyond the new year, it is practically impossible to do any intelligent forecasting in view of the many uncertainties which have crowded into the picture, especially in the last two months. Certainly the cream of new car buying has been skimmed off in the past year, and in this cream was a good share of the many billions which the government fed into trade channels, a windfall which is likely to lessen in intensity in the years ahead. The normal replacement market for cars is considered to be somewhere near 3,500,000 annually, and if the industry exceeds this figure, many concede it will be doing as much as can be expected.

Steel, of course, continues to be the No. 1 material for automobiles. Practically without exception automobiles have gone to all-steel bodies and tops, and last year saw no important change in the amount of steel used per car. Actually, there appeared to be a slight reduction in the per-car poundage, reflecting the efforts of engineers to lighten car weights without sacrificing strength, a procedure made possible by the improvement in steel quality and the strength of the lower alloy steels.

Calculations show that for 1937, an average of 2536 pounds of finished steel went into each of the



A blank is slid into position, a button is pressed, the massive upper die descends, a whoosh of air gushes from ports in the lower die, and another De Soto front fender is ready for trimming and finishing

4,968,000 cars produced. Tabulated, the statistics show:

Year	Car and Truck Production in United States	Automobile Consumption of Finished Steel % of Output	Gross Tons	Pounds Finished Steel per Car
1920.....	2,227,349	7.50*	2,426,089	2439
1921.....	1,616,119	9.82	1,450,807	2010
1922.....	2,544,176	8.98	2,375,390	2091
1923.....	4,034,012	10.59	3,524,042	1957
1924.....	3,602,540	11.37	3,193,427	1985
1925.....	4,265,830	14.60	4,874,496	2559
1926.....	4,300,934	15.09	5,356,330	2789
1927.....	3,401,326	13.34	4,386,062	2888
1928.....	4,358,759	17.76	6,688,934	3437
1929.....	5,358,420	17.57	7,125,896	3017
1930.....	3,355,986	14.10	4,161,334	2777
1931.....	2,389,730	14.78	2,834,197	2576
1932.....	1,370,678	18.15	1,896,856	3091
1933.....	1,920,057	20.95	3,505,982	4800
1934.....	2,753,111	20.87	3,984,830	3203
1935.....	3,946,934	24.04	5,005,784	2812
1936.....	4,616,274	20.87	6,068,187	2629
1937*....	4,968,000	18.00	6,300,000	2536

*Estimated totals for 1937.

In view of the heavy sales of new cars last year, it was a natural consequence the figure for total registrations of motor vehicles in this country should gain appreciably. Ten months' registrations of new cars totaled 3,077,134. Estimating for the last two months of the year and figuring in the number of cars retired from service brings total registrations to about 29,257,000. This means that there is now one automobile for every 4.38 inhabitants of the country. The trend over the past 15 years:

Year	Population United States	Registration, All Motor Vehicles	Ratio of Population per Vehicle
1925.....	115,378,000	19,937,274	5.78
1926.....	117,136,000	22,001,393	5.32
1927.....	118,628,000	23,133,243	5.12
1928.....	120,013,000	24,493,124	4.90
1929.....	121,500 000	26,501,443	4.58
1930.....	122,775,000	26,545,281	4.62
1931.....	124,070,000	25,832,884	4.80
1932.....	124,822,000	24,115,129	5.17
1933.....	125,693,000	23.843,591	5.27
1934.....	126,425,000	24,933,403	5.07
1935.....	127,172,000	26,230,834	4.86
1936.....	128,429,000	28,221.291	4.55
1937*.....	129,780,000	29,257,000	4.38

*Estimated.

■ DESPITE prospects for a slower production pace this year, there is no long-range pessimism in the motor industry. From the standpoint of new plant capacity and new equipment installation, the year just ended came close to setting all-time records. Millions upon millions were allocated by managements for new building programs in the Detroit area as well as outside of Michigan.

General Motors additions include a new Ternstedt hardware manufacturing plant in Trenton, N. J.; the new Linden, N. J., assembly division; a new diesel engine plant in Detroit; a Chevrolet motor and axle plant at Tonawanda, N. Y.; expanded Fisher Body press shop in Flint; a new parts plant at Rochester, N. Y.; a new service division for the Inland Mfg. Co. subsidiary at Cranford, N. J.; and other smaller improvements.

Chrysler Corp. began a new transmission plant at Kokomo, Ind.; a new Dodge truck assembly plant in Detroit; a new engine plant in Windsor, Ont.; erected another floor on the DeSoto plant in Detroit; re-equipped and expanded two Chrysler plants in Detroit; bought property in Detroit for future expansion; took over a former Graham-Paige plant in Detroit for storage purposes.

Ford announced construction of a new blast furnace and coke ovens; expansion of open-hearth capacity; installation of bessemer converters; a new alloy steel foundry; improvements to hot and cold rolling equipment; new gas holders; a new tire plant; additions to glass plant; a new press division and body plant; a new centralized tool and die shop; a new turbogenerator; and two new "village industries," in Northville and Milford, Mich.

Packard authorized expenditures of some thirteen millions for new equipment and plant rearrangement as a part of its 4-year $250,000,000 program for promoting its two lower-priced models which have been so successful since their introduction.

Nash appropriated well over $1,500,000 for additions to its facilities at Kenosha, Racine and Milwaukee.

All in all, it is estimated that upward of $200,000,000 was earmarked for expansion and equipment programs, so the motor industry is girding for even better times than those experienced in 1937, confident that the future outlook for profits is undimmed, sure in its belief that the only way to make money is to spend money.

■ OBVIOUSLY the biggest, yet undeniably the saddest aspect of the year in motordom was the sitdown strike and the unparalleled wave of labor disturbances and unrest which followed in the wake of strikes early in the year. With the possible exception of Ford, no major producer was free from the serious setbacks caused by actions of the militant United Automobile Workers division of the CIO.

To Detroit this experience was all the more amazing, because the motor city for years had boasted of its open shops, its high wages, its unhampered labor. But this boast must be forgotten now, for there is probably no industrial section of the country which seethes and boils with interunion and union versus nonunion labor unrest that is common in Detroit plants today.

The cost of the 1937 sitdown strikes and their aftermath has been terrific. Conservatively speaking, they probably cost the 515,000 employes in the automobile manufacturing industry somewhere in the

neighborhood of $75,000,000 in wages, or a per capita loss of about $146. Their attendant effect on workers in tributary industries was equally important, but difficult to estimate.

Sitdowns may have temporarily depressed production figures, but for the year as a whole, the industry showed remarkable recuperative powers in making up for lost time accruing from strikes.

■ THE cost of strikes on financial performance of various units in the industry is not so easily ascertainable, because of the mounting material and wage costs experienced during the first nine months of 1937. But production of cars was averaging about 15 per cent ahead of the previous year, so perhaps the following comparison of net earnings may show to a considerable extent the telling effect of sitdowns:

	Net Earnings		
	First 9 Mos. 1937	First 9 Mos. 1936	Per cent Change
Briggs Mfg. Co.	$7,815,310	$8,867,248	—11.9
Chrysler Corp.	40,424,211	41,975,327	— 3.7
General Motors Corp.	154,958,000	175,198,624	—11.5
Murray Corp.	844,275	1,210,063	—30.3
Packard Motor Car Co.	1,494,205	3,562,918	—58.1
Electric Auto-Lite Co.	3,182,467	3,007,378	+ 5.8

As typical, consider the Chrysler Corp., showing a loss of 3.7 per cent in net earnings in face of a 19.3 per cent increase in dollar volume of sales and a 14.2 per cent increase in number of units sold.

In these figures lies the story behind increases in retail prices of new models put into effect by all producers for this year. Retail prices were raised twice in fact, once just before the close of the 1937 model season, or about Oct. 1, and again as the 1938 models were being introduced. Average increase throughout the industry probably amounts to about 10 per cent.

Officials of motor car companies maintained, and justly so, that the increases in prices did not cover their increased costs for labor and materials, but that they were essential if the companies were to realize a fair profit. Up to the present these explanations have been received coldly by the public, one most important reason for the year-end drop in new car sales.

The public's attitude can be appreciated readily. Used cars failed to move upward in price along with new cars, thus widening the spread between used car and new car values. Granting his desire to buy a new car, the average buyer, when given a figure on his trade-in, concludes he will wait before buying, on the chance of two things: (1) An upward movement of used car prices, or (2) a downward revision of new car prices.

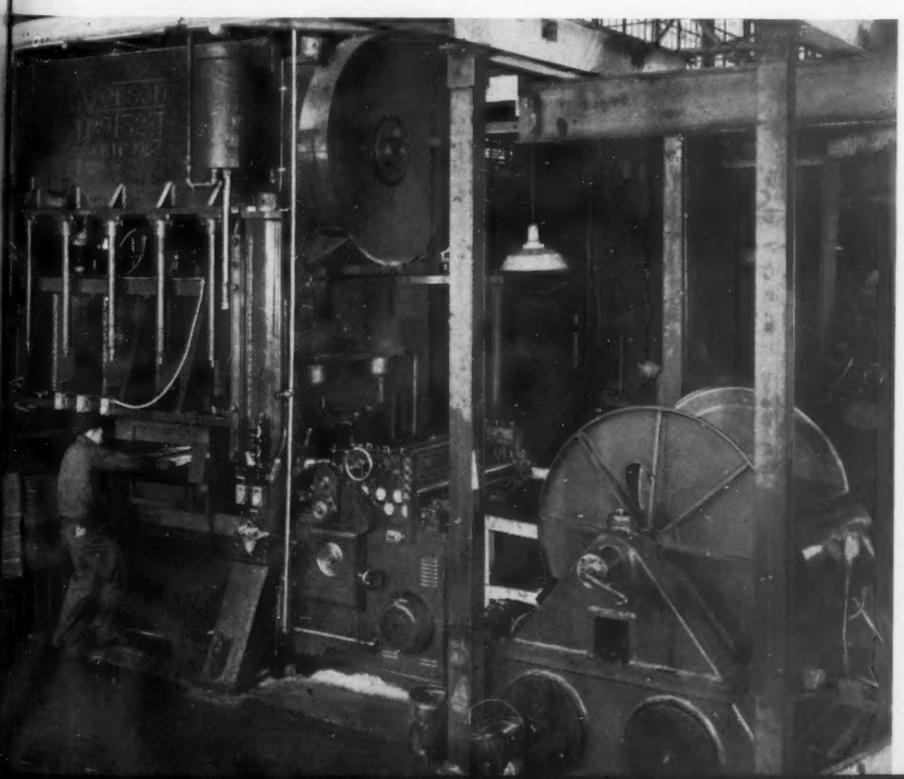
In spite of the millions spent by the motor industry on plants and equipment, the designs offered for 1938 do not differ sharply from those on the market for the past year. For one thing, expenditures for body dies were held down last fall and, with a few exceptions, the new bodies are similar to the former models. Designers' efforts were concentrated on radiator grilles and other decorative features. The fact that 1938 is a so-called "off-year" for body changes may be one explanation. High cost of strikes and labor disturbances is a second reason for holding down on die expenditures. A third logical explanation may be that automobile experts foresaw a "soft" year in prospect for the next 12 months and purposely decided against any elaborate changes in design or construction. It is a fairly safe prediction that the 1939 models will see some sweeping changes in appearance, and engineers are already at work on them.

■ SCANNING eventful news of the industry for the year, Graham made a renewed bid for a larger share of the so-called independent business last year with a radically restyled car, carrying out the interpretation of streamlining as evolved by the late Amos Northrup. Graham consolidated its operations into one plant in Detroit, and its organization was given a thorough overhauling and shaking up preparatory to launching its 1938 program.

Hupmobile reappeared on the automotive scene after working out a financial reorganization and showed conservatively styled sixes and eights at the automobile shows. Observers in December were giving Hupp a 50-50 chance of surviving.

Another newcomer to the automotive scene was

(*Please turn to Page* 374)



New setup for cutting of front fender blanks in Pontiac plant. At right is a reel carrying cold-rolled strip steel which is fed through a roller leveler and then through feed rolls and the side of the press into the blanking die. Piles of blanks are shown on the skid platform. The equipment has just been installed for use in 1938 model production

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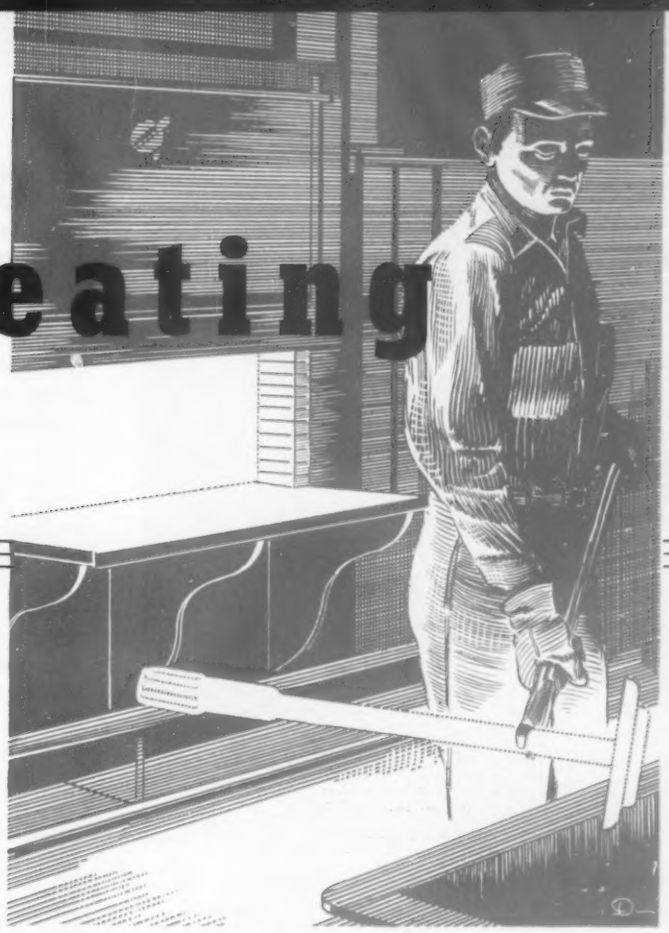
heat treating



■ SIGNIFICANT trends were discernible during 1937 in heat treating practice and in selection of steels for heat treatment. No strictly new processes were developed, but experience with existing methods was productive of improved procedures. Expanding uses were found for induction hardening and induction heating. Salt baths were employed more widely for both carburizing and annealing. Gas carburizing found new converts and carburizing steels were specified more rigidly as to grain size. More extended use was made of controlled atmospheres to provide scale-free work in both hardening and annealing. Flame hardening grew in popularity, particularly for treating localized areas.

A greater tendency for buyers to specify grain size in steel purchases is observed by W. B. Coleman, president, W. B. Coleman & Co., Philadelphia, and because of this recognition of one of the finer details, steelmakers are able to produce metal of better physical characteristics. These improved characteristics are essential from an operating point of view and at times from weight considerations.

Observations indicate a gradual change taking place in carburizing; plants now turning to controlled atmosphere furnaces for production of case. Mr. Coleman also states that recognition is being given to the value of electrically-heated salt baths in which the heat is liberated directly from electrodes in the bath.

Commenting on the fact that alloy steels gradually have taken the place of carbon steels for certain requirements, he points out that through recent improvements in control of slag and metal in the open-hearth furnace and rigid application of these newly discovered principles it now is possible to produce carbon steels having better physical properties. As a result, substitution of carbon steels for alloy steels can be made for some purposes. However, Mr. Coleman concludes, this will not continue indefinitely because alloy steels of better physical properties will be developed. It is simply a case of choosing an available material which best meets the demanded specifications.

It is the opinion of G. C. Riegel, chief metallurgist, Caterpillar Tractor Co., Peoria, Ill., that a good beginning has been made in the much neglected field of steel quality control, namely, that of hardenability. Citing the work on quantitative hardenability and hardenability tests for carburizing steel, reported by R. S. Archer and W. E. Jominy, respectively, at the recent annual meeting of the American Society for Metals, he regards these contributions as the most important on the problem of control of steel quality and application of tests to have been suggested since general adoption of grain size control as originally outlined by McQuaid and Ehn.

For a number of years, the laboratory with which Mr. Riegel is connected has co-operated with steel sources in applying mill heats of simple carbon steels according to a quantitative measure of hardenability which in production practice has been found to be accurate to within variations of 1/16-inch of diameter on sizes 1¼ inches and smaller. Quantitative values are determined by plotting the hardenability curve and calculating the area from a base with a planimeter.

Experience has been developed for application of heat treated cold finished steel in one plant, cold finished cold heading steel in another, and hot rolled machined steel in a third. According to Mr. Riegel,

Marked increase in the use of flame hardening for applications where selective hardening is desirable has been noted over the past year

this method of guidance has been singularly good in view of the fact that less than one mill heat in 200 has been lost through misapplication.

Observations made during the past year by S. K. Oliver, metallurgist, Delco Products Corp., Dayton, O., were centered around an electric induction-type furnace for heating a cyanide bath. He is convinced that this type of furnace for heat treating has a definite place in the industry. Possibilities of this type of equipment appear to be beyond expectations in spite of the fact that numerous difficulties are experienced with present units.

Continuing, he feels certain that if industry investigates and promotes research on induction-type equipment for heat treating, especially in the tool hardening field, a considerable saving along with higher standards will result. This type of furnace offers much toward advancement of uniformity in hardening of tool steel.

Appraising research activity of 1937, R. L. Dowdell, professor of metallography, University of Minnesota, Minneapolis, comments that much has been accomplished in furnace design and fuels with considerable attention to atmospheric control. Development of proper gas atmosphere for specific annealing and hardening operations, however, is slow because of the complicated variables encountered with the large variety of materials to be treated.

The induction hardening process is opening wide fields for the hardening of special steel sections and the future will show considerably greater applications, in his opinion. All of the fields of steel treatment have advanced; future possibilities seem to point strongest toward induction hardening and interrupted quenching, or austempering. In concluding, Prof. Dowdell referred to the sustained intense interest in carburizing steels of controlled grain size.

Although H. S. Rawdon, chief, division of metallurgy, national bureau of standards, Washington, regards nothing in the heat treatment field for 1937 as an outstanding novel development, he is impressed considerably by the continued advances during the year along the line of accuracy and nicety of control and reproducibility. As an example of this, he cites the flame process for cutting and heat treating in particular as giving a remarkable degree of precision, a precision unbelievable only a few years ago.

Flame hardening also is an object of comment by Dr. G. V. Slottman, assistant manager, applied engineering department, Air Reduction Sales Co., New York, who states: "Of considerable interest is the revival of the old process of flame hardening. The past year has seen practically the universal acceptance of flame-hardened gears, particularly those of large size. An active development is now in progress and it probably will be one of the features of the coming year as it offers the two-fold advantage of producing hardness at the wearing surface of a machine part and of maintaining a ductile shock-resistant core."

See Wider Use for Radiant Tubes

The year just passed has seen a further extension of the use of radiant tubes for heating purposes, states R. J. Cowan, metallurgical engineer, Surface Combustion Corp., Toledo, O. Malleable iron annealing furnaces have been installed, both batch and continuous, having controlled atmospheres. Furnaces for spheroidizing high-carbon steel have been built using this method of heating to good advantage. It has been applied also to tube annealing furnaces in which a variety of tubes of varying sizes are being annealed. It is believed, he asserts, that interest in this matter will continue and that the coming year will see further extensions along these and similar lines. Results which have been obtained by use of alloy in the tubes have been most gratifying.

Interest in gas carburizing has continued unabated throughout the year, and, according to Mr. Cowan, several large installations have been made. Great interest is being shown in the extension of these methods to include also the addition of nitrogen to the carbon case. This is being used particularly for light case carburizing of a type similar to that produced by a cyanide bath, but it is not limited to this. Interest has been awakened, says the writer, in the possibilities of regulating both the carbon and nitrogen contents of the case and it is expected that the new year will see some further application of these ideas.

Continuing, Mr. Cowan reports considerable interest in convection heating for low-temperature applications. The mechanics of conveyors and furnace mechanisms has been improved further during the past year and there has taken place a notable change in the design of alloy parts which are used in furnace structures.

Sizing up progress during the past year, C. L. Ipsen, industrial department, General Electric Co., Schenectady, N. Y., reports a wide extension of electric heating applications rather than introduction of many new processes and types of equipment. One of the possible exceptions to this circumstance lies in the field of inductive heating. High-frequency induction heating furnaces have won a substantial acceptance as economical equipment for production

of surface hardened parts. Noteworthy improvements in, and additional experience with, existing equipment in such fields as scale-free hardening and malleable annealing have speeded production processes at the same time lowering operating costs and generally improving products.

Speaking on the wider acceptance which induction hardening gained during the year, Mr. Ipsen pointed out that advantages of the process are the ability to obtain in a few seconds hardened bearing surfaces on crankshafts and camshafts with tough cores and without affecting other parts of the steel. The frequency required for surface heating depends upon dimensions of the piece, resistivity of the metal, and desired depth of hardened zone. Hardening has been accomplished with 1920 cycles.

Annealing of malleable iron now is receiving considerable attention, he continues. Only a short time ago, the usual annealing cycle was from 5 to 10 days, depending upon size of furnace. At present, annealing cycles of 16 to 42 hours are being run on regular production, the time-temperature cycle in each case depending upon analysis of the iron, type of furnace, and results desired.

By use of electric furnaces with protective gas atmosphere, the castings leave the furnace without scale, thereby saving considerable in cleaning operations. Through use of continuous or batch-type short-cycle annealing furnaces, there is a definite control over the time-temperature cycle, thus assuring that all castings will receive exactly the same treatment.

Atmosphere Control Prevents Scale Formation

Several types of scale-free hardening furnaces and atmosphere control equipment have been developed. The most commonly used, says Mr. Ipsen, is a conveyor-type unit operating with a combustion-type atmosphere controller. The furnace is essentially a long, refractory-lined, heat-insulated chamber electrically heated, and equipped with an endless-belt conveyor entirely enclosed in the chamber. Material to be treated is placed on the conveyor by a tray-type charging device and is heated as it is slowly carried the length of the chamber. At the end, it falls off and down through a sealed chute into a quench bath.

The combustion-type atmosphere controller controls accurately the combustion of coke oven gas, natural gas, or butane, in such a way that the products of combustion may be used as a protective atmosphere. Furnaces equipped with this apparatus reduce the influence of the human element, Mr. Ipsen asserts, and because no scale is formed, hardening is uniform.

Dealing also with electric heating equipment, C. E. Peck, section heating engineer, industrial heating, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., states that commercial equipments and installations now exist in which it is possible to heat treat high carbon steels without trace of either oxidation or decarburization. This is accomplished, he explains, by surrounding the work being heat treated with a carefully prepared partially burned hydrocarbon gas atmosphere in which all of the decarburizing and oxidizing components of the atmosphere, such as carbon dioxide, sulphur and water vapor, are removed entirely. Previously, Mr. Peck points out, this type of heat treatment could be carried out only with the more expensive dried dissociated ammonia atmosphere.

A typical commercial installation of this equipment is a bell-type electric furnace in which high carbon steel strip is heat treated in such a way that the resultant product has a bright surface, and in addition there is no decarburization whatever on the surface of the steel.

According to Mr. Peck, the new type of atmosphere is prepared at a cost of from one-sixth to one-tenth that of dissociated ammonia, and in addition the use of this atmosphere results in other economies in heat treatment, because it insures a uniform quality in the heat treatment which is not attainable when carefully prepared and controlled gas atmosphere are not used.

Discovery of attractive age or precipitation hardening characteristics of several copper alloys has placed demands upon the nonferrous industry to obtain heat treating equipment suitable for operating at higher temperatures than previously has been necessary for ordinary annealing operations. Contributing comments upon this subject, H. P. Croft, chief metallurgist, Chase Brass & Copper Co. Inc., Cleveland, states that in the past brass mill annealing has been carried out at temperatures ranging from 500 degrees Fahr. for stress relieving operations up to perhaps 1400 degrees Fahr. for homogenizing anneals of some castings.

In handling precipitation hardening alloys, however, Mr. Croft asserts it is necessary to raise these temperatures still higher to insure complete solution and subsequent precipitation of all the constituents responsible for increase in hardness. Temperatures up to 1900 degrees Fahr. sometimes are necessary. These conditions, he points out, could not be attained with existing equipment. In addition to the temperature requirement, it is desirable to heat treat under nonoxiding conditions so as to avoid oxidation of the hardening constituent from the area near the surface.

To meet these difficult conditions, it was decided to try annealing in molten salt. Economical handling dictated heat treating the material in 12-foot lengths, consequently a furnace was built having a

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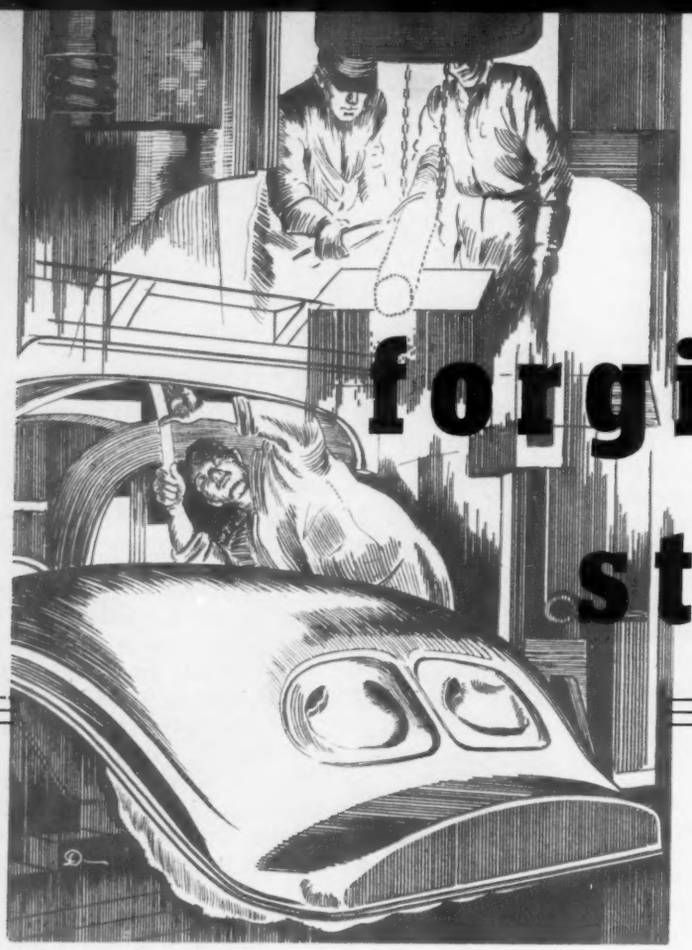
Controlled atmospheres which will prevent decarburization as well as scale formation are rapidly being adopted in many applications



forging and stamping

■ ACCORDING to the best-versed men in the forging industry, the goals toward which forging plants are constantly working remain the same, generally, as they have for countless years in the past. Each year significant new developments raise the standards and set up new limits not approachable previously. Tolerances which were quite satisfactory for many requirements drop out of line with the demands for highly standardized units and high speed production. In modern forging practice as in all industry, the customer is king and his demands are the aims at which forging men shoot.

In general, trends are toward heavier, more rugged machinery which will permit closer tolerances with lower die wear and machine depreciation. Reduction of die costs remains one of the cardinal problems in which forging men seek the aid of steelmakers. Education in two directions is among the "musts" of the industry. In the first place, education of the metal-using industries as to the possibilities of forgings is required in order to open up for forgings the many applications where they might be used to advantage. The second most important educational program is that of educating engineers and designers in the design and manufacture of forgings in order to increase the number of possible applications of forgings.

One of the interesting trends in the American forging market, in the opinion of R. E. W. Harrison, vice president, Chambersburg Engineering Co., Chambersburg, Pa., is the increased use of compressed air as a power medium. Mr. Harrison believes this to be due partially to the efforts of power companies who wish to sell electric power, partially to the feeling on the part of many users that air is more economical when shops use up to six hammers, particularly when costs are reviewed on a 12-month basis.

Probably the most significant trend is the increasing accuracy of drop forging dies and the reduction of surplus metal on the work produced, stated Mr. Harrison. This surplus formerly constituted an extremely heavy workload for the regular metal removing tools. Today it is appreciated that, with draft on the dies as low as 1½ degrees, plus facilities within the hammer itself for accurate matching of the dies at all times, it is false economy to leave a wide margin of metal. Modern practice is to forge as closely as possible and finish by grinding, eliminating intermediate machining operations as often as possible.

In all impact type tools, Mr. Harrison said, his company finds a growing appreciation of the increased reliability and ultimate economy to be achieved by the use of the higher grade alloy steels instead of carbon steels for such elements as rams, piston rods and anvil caps.

One of the most important developments in the forging industry for 1937, according to Adam M. Steever, superintendent, Columbia Tool Steel Co., Chicago Heights, Ill., was the adoption of a set of standard tolerances by the Drop Forging association. Probably the most significant advance, from Mr. Steever's viewpoint, occurred in improved heating methods for forging. Improvements along this line have included wider use of controlled atmospheres and automatically controlled temperature in heating steel and forged parts which will depend on subsequent heat treatment for their properties. To make use of these factors, many new furnaces have been designed and adopted.

Heating also takes the foreground in the comments

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of John A. Webber, production manager, Interstate Drop Forge Co., Milwaukee. Extension of controlled atmospheres into the field of scale-free hardening is one of the most important recent developments, he says, and it has been made possible by the development of prepared atmospheres for introduction into electric or radiant tube type furnaces. Furthermore, to quote Mr. Webber, "it appears likely one of the important new developments to be expected in the future will be preparation and control of atmospheres for controlling the carbon content of the surface of the steel. This would make possible controlled carburization as well as controlled decarburization."

Improvements in die steels, in methods of die-making, in furnace design through the use of improved refractory materials—these are the important factors in the "new school" of forging practice which lead the way to greater profits, according to Mark Monaghan Jr., vice president, Mondie Forge Co., Cleveland. Good housekeeping in the forge shop, long considered an impossibility, can be employed to good advantage in reducing cost of production by reducing wear in moving parts and also in improving working conditions.

Improvement in forging machinery has been entirely in refinements of existing practice, in the opinion of R. H. Jones, National Machinery Co., Tiffin, O. The objectives toward which these refinements point are slowly being reached; numbered among these are completely finished forgings which require no further finishing operations, absence of all flash, and forged pieces with holes ready for broaching, requiring no further drilling.

Forging quality is being given greater thought by forging users, states Mr. Jones. "Improper grain flow, cold shuts and the like will no longer be tolerated. In fact, many forging buyers now show grain flow patterns on their forging prints," he said.

High spots in the drop forging industry, as outlined by L. E. Ruby, works manager, Riverside Forge and Machine Co. division, Pittsburgh Forgings Co., Jackson, Mich., include increasing use of heavy duty presses for forging. Some companies are using presses for forging ring gears up to considerable size, while many other parts are being made by presses as being more economical than other methods. Use of these presses in combination with other methods to simplify operations also has been noted in some cases. This is a notable trend, and one which will bear close watching.

Standardization of forging tolerances is becoming a reality, due to the small amount of finish being specified, Mr. Ruby stated. Grain flow is in for serious consideration. In many cases sample forgings are being examined for grain flow before actual production is started. Machineability of forgings is being given more consideration than formerly. Use of free machining steel is increasing, while in other steels elimination of free ferrite lines has proven the best machineability for equal strength and hardness.

Stainless Steel Used

An interesting factor is brought to light by Mr. Ruby when he states the increase in steel price has caused a further reduction in draft angles. In line with this same trend is the increase in displacement piercing of deep holes to eliminate a lot of gross steel. Forgings are now being produced with punched holes ready for broaching, with no part line fins to be trimmed off.

Stainless steel forgings have been given added impetus by a number of new applications during the past year, according to Waldemar Naujoks, chief engineer, Steel Improvement & Forge Co., Cleveland, and a greatly increased field of application for these pieces is seen. This has made it necessary to use tougher and stronger die blocks and tool steels with greater wear resistance, to make commercially feasible these forgings from tougher materials. Steelmakers have co-operated to a considerable extent in supplying these stronger alloys.

This trend toward stainless and corrosion resisting steels is also noted by R. W. Thompson, Transue & Williams Steel Forging Corp., Alliance, O. Another tendency, in Mr. Thompson's opinion, is for the forging buyer to combine the several pieces of the assembly of a certain part into one drop forging. These developments naturally create intricate die designs which require quite a bit of study in order to assure the proper flow of metal.

Says Mr. Thompson, "A precise control and knowledge of forging furnace atmospheres is a development which is occupying the minds of forging plant engineers for the improvement in quality of drop forgings, particularly those of the stainless types, as well as those wherein surface finish is extremely important.

"It is contemplated forging furnaces will be built hav-

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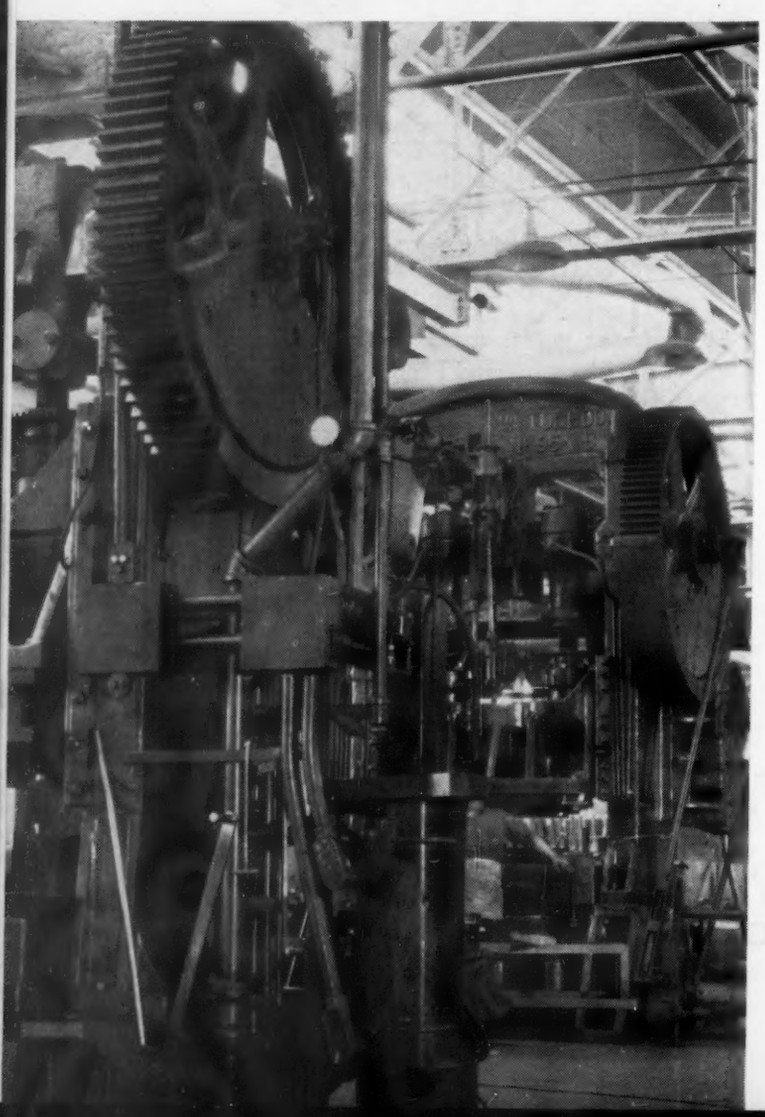


Improvements in die steels and education of designers to a realization of the limitations of deep-drawing for practical production marked the most important forward steps in stampings

materials handling

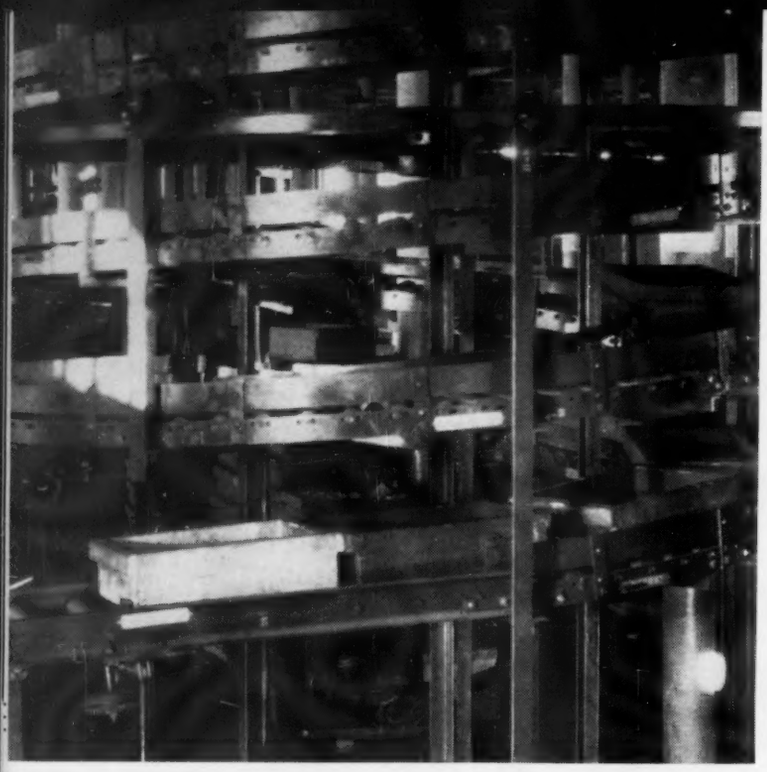
■ CONDITIONS which faced American business management a year ago induced the prediction, at that time, that there would be "a continued and strong demand for mechanical handling equipment during 1937." A survey, completed during the past fortnight, provided definite proof that the forecast was in no sense too optimistic. Reports received from representative manufacturers in all lines of materials handling equipment show that they experienced in 1937 one of the most satisfactory sales volumes in their history.

"It is more apparent than ever," according to Frank E. Moore, president, Mathews Conveyer Co., Ellwood City, Pa., "that, if industry is to produce goods at a price, materials handling equipment in its many phases must be applied to a much greater extent than ever before. It is not new to heads of industry that this class of equipment is related directly to profits. One thing in particular which will help to create maximum efficiency in the handling of materials is the fact that more and more manufacturing plants are being designed around their handling requirements and equipment. Until the latter part of October, 1937 proved to be a very good year for practically all industries. The materials handling industry fared exceptionally well, in view of the fact that the management of many plants saw fit to modernize their manufacturing processes. As to the outlook for 1938, we view the situation at present optimistically, although we feel there is a possibility of a brief slump unless the entanglement of governmental red tape can be straightened out promptly so the much needed direct action by Congress can be taken."

Most important of developments in materials handling, in the opinion of W. V. Casgrain, president, Mechanical Handling Systems Inc., Detroit, "is not so much one embodying mechanical improvements as it is the development of the broader view of the entire picture, and the development of programs to help bring about peacefully and profitably for all concerned the transition from the old to the new. A manufacturer who recognizes this fact will continue to keep pace with developments as the world makes them, and he who today denies the existence of these conditions and refuses to acknowledge these facts will drop by the business roadside. The trend of the times will call upon the materials handling industry for the greatest contribution it has ever made. Mechanical handling is the only safe route to higher wages and shorter hours."

Progress in the materials handling equipment field, in the opinion of E. E. Boberg, general sales manager, Standard Conveyor Co., North St. Paul, Minn., "has been chiefly one of steady improvement rather than creation of any new designs. Greater efficiency in application of conveyor equipment for the coming year is inevitable because all improvements of past years can be applied in the construction of equipment and its application. Such equipment serves the useful purpose of moving commodities from point of origin, or point of processing, through various operations to point of storage or shipment. The fact that conveyors have been developed to handle loads varying from a few pounds to 25,000 or 30,000 pounds makes it possible for planning engineers to select a conveyor to move practically any load with the least cost."

As higher speed production tools are constantly supplanting older and slower speed units, so must



Revision of antiquated handling systems and installation of special equipment for particular applications is indicative of the demand for time and money saving materials handling equipment

more rapid means for handling materials supersede the primitive. Such is the belief of B. Van Horn, manager, crane sales department, Harnischfeger Corp., Milwaukee, who stated: "Greater attention by far has been given to develop equipment for reducing manufacturing operations and decreasing weights without impairing strength, by use of steel alloys, forgings, stampings, hardening processes and welding. Not to the same extent, however, has it been directed to more rapid and economical methods of handling and routing raw materials and finished stock in process of fabrication, assembling and loading. Except where mass production has been highly mechanized, antiquated means for unloading transferring, conveying, storing or stacking materials still exist. In seeking further economies, much can be accomplished with more rapid and economical means of handling materials. Cranes and hoists installed years ago, for example, with sleeve bearings and sluggish control, were not motored and geared to operate at the rapid speeds and lower operating and maintenance costs which now prevail."

Volume of sales of monorail equipment as reported by leading manufacturers for the first three quarters of 1937 increased tremendously over the same period of 1936. Commenting on reasons for this, H. M. Miller, president, The American Mono-Rail Co., Cleveland, explained: "It is becoming more and more evident that efficient methods of materials handling call for the application of skilled engineering practice. A monorail installation today is no longer a matter of deciding how much and where to put the tracks and switches. In nearly every case, it involves a thorough study of not only the handling problem, but also its relation to processes en route. Profit possibilities are becoming more apparent. They have always been available, but are acquired efficiently today only after careful consideration by experienced engineers.

Progress made in this branch of the industry during the past year is further attested by John Booher, advertising manager, Cleveland Tramrail Div., The Cleveland Crane & Engineering Co., Wickliffe, Ohio, who said: "Business and progress during 1937 have been very encouraging. As far as this company is concerned, some very large and outstanding orders were received for installations in the steel, rubber and glass industries. The outlook for 1938 seems to be very good."

Manufacturers of industrial trucks have enjoyed one of their busiest years. Like other branches of the industry, they had utilized the depression years to good advantage. Commenting on this phase, E. F. Twyman, general manager, Automatic Transportation Co., Chicago, explained: "For several years, engineering departments of various companies comprising the electric industrial truck industry have devoted most of their talents and energies to producing new models of industrial trucks, tractors and cranes having far greater efficiencies and greater load capacities than were previously believed practical.

Many New Power Trucks Used

Outstanding development in the basic steel division, reports C. B. Cook, sales promotion manager, Elwell-Parker Electric Co., Cleveland, "was its acceptance and demand for power industrial trucks of the ram and fork type. Advantages of these trucks to work in close to rolls and to deliver to other bays, or to machines set offside, have been demonstrated to the satisfaction of mill engineers. One new steel mill alone will require 43 of these machines for handling coils and tin plate. Power steer has been employed more extensively on the heavier duty machines of 12,000 to 15,000 pounds, while 4-wheel drive has been more in demand on account of wet floors. Another change is the acceptance of standard fork trucks to handle newly designed bosh boxes in the transport of submerged tin plate in process. This has displaced some of the former bosh trucking methods. Another noticeable development in the steel industry has been a tendency to accede to customers' demands for unit packaging of sheets, rods and tubes so that the buyer may also handle the product out of cars into storage at less expense. More thought is being given to trucks which can handle semi-finished product into cars for delivery from one division of a steel company to another at some other location."

Practically all manufacturers of materials handling equipment, according to K. D. Tracy, sales department, Baker Industrial Truck Division, Cleveland, "spent most of the depression improving their lines and developing new equipment and during the past year continued this policy of steady improvement. The fact that the industry in general was working at near capacity shows the interest that is being taken in handling operations. With no signs of a let-up in rising labor costs and government regulation of business, and since handling in process adds only to the cost of the finished product and increases the value of that product not one iota, it would seem that this handling is the logical place to start for a reduction in finished cost to compensate for higher manufacturing costs."

"Tendencies in the industrial truck industry," states P. K. McCullough, advertising manager, The Mercury Manufacturing Co., Chicago, "have been toward machines of special nature for particular ap-

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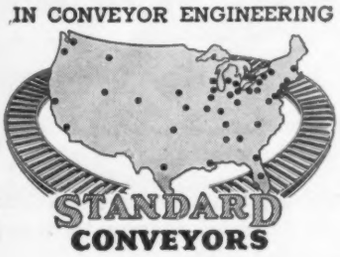

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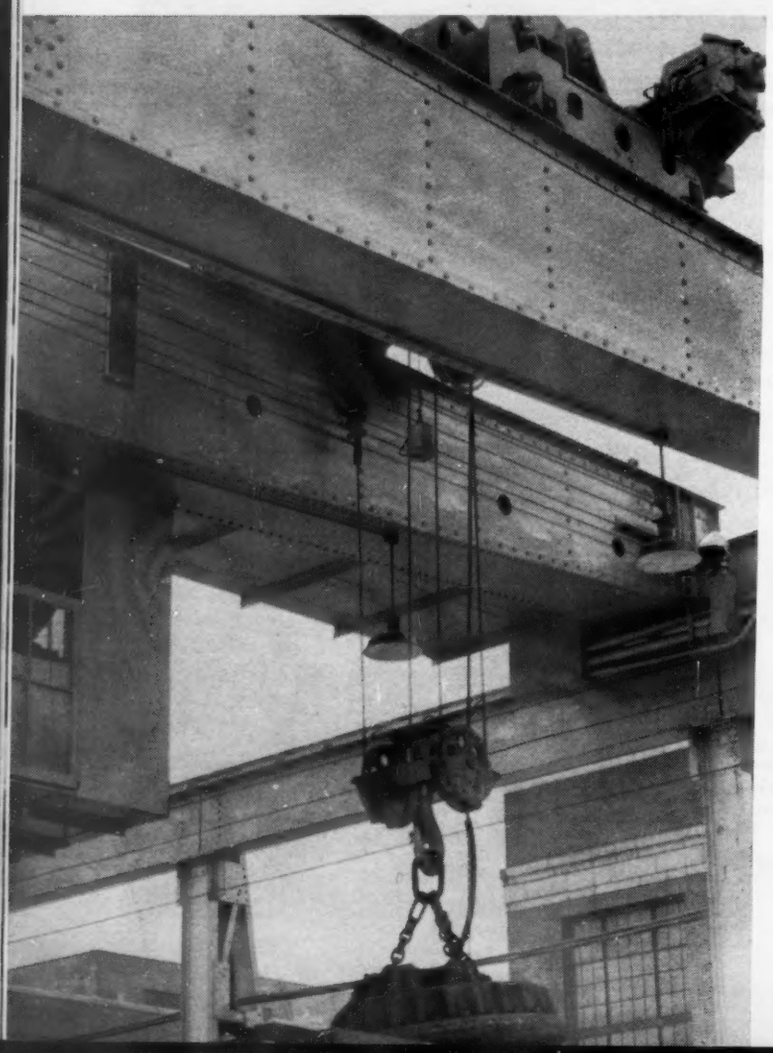
plications, and toward vehicles of increased capacity capable of longer operating periods, which have involved, in turn, the development of power sources of increased capacity. It is during periods of rising business activity that production machinery and methods undergo modernization. This is the result of competition, which is met best by both low production costs and ability to deliver a volume output on schedule, and usually consists of changes in machinery and methods which will effect, above everything else, an increased production rate. It is at this point that materials handling equipment enters the picture again, for advantages of improved production processes cannot be realized fully unless incoming material and finished products are handled at the pace required by improved production and at the lowest cost possible."

Testifying to further advances in industrial trucks, Lester M. Sears, managing partner, Towmotor Co., Cleveland, stated: "In our own division of the materials handling field, we have been impressed particularly by the tendency to handle larger and larger unit loads, and by the application of power equipment to handling of materials, containers and packages which were not considered even possible a few years ago. As examples, we cite the very large diameter die-handling trucks recently developed, as well as the 5- to 20-ton coil and strip handling trucks of either ram or conveyor platform type. Materials handling operations in general are probably the least mechanized field of industry and consequently more susceptible to increases in costs. As almost every field of direct production has demonstrated, increasing mechanization is the answer."



Increased efficiency in materials handling operations has been the key to financial success in many manufacturing operations

No single class of materials handling equipment was overlooked in industry's search for handling aids. This is indicated in many reports. For example, Peter Germond, engineer, Revolvator Co., North Bergen, N. J., states: "Our business for the nine month period up to October 1 was approximately 45 per cent ahead of the same period of 1936. Our experience over the past year indicates that more business is available. Hence we are making preparations for an even greater increase in our 1938 sales. Need for efficient materials handling methods is greater than ever as increased taxation demands economies all along the line."

In the past, cost reducing equipment has been bought and installed principally with the objective of increasing profits; today, cost reducing equipment must be installed in many cases *in order to stay in business,* according to L. C. Blake, advertising manager, Curtis Pneumatic Machinery Co., St. Louis, who furthermore stated: "Up to the time of the combination of general recession in business and a seven weeks' strike at our plant, which is now terminated, we were materially ahead of our 1936 volume. The curve has flattened out somewhat now, but we are confident that, if there is not too much of a sensitive reaction to the stock market and political situations, 1938 will continue to reflect the better showing which 1937 has shown up to recently. From our inquiries and orders, it is quite apparent that industry in general is bringing its physical plants up to date not only rehabilitating existing equipment and methods of production, but indicating a greater tendency toward superseding of costly practices with modern power handling equipment."

One road to profits for 1938 is pointed out by A. DeYoung, advertising manager, Whiting Corp., Harvey, Ill., who stated: "Our crane business in 1937 was approximately 30 per cent greater in volume than the preceding year. Undoubtedly there are many places where obsolete equipment and methods add to the cost of manufacture. Frequently, such obsolete equipment, particularly in the case of overhead cranes, is very expensive to maintain and operate. We have had instances where the cost of maintenance was so high that it took only a half year to pay for a new crane on this saving alone."

Bulk handling equipment has been keeping pace with general demand, according to W. L. Fewsmith, advertising manager, Robins Conveying Belt Co., New York, who stated: "The material handling industry during 1937 has made very appreciable progress, both in the quantity and quality of equipment sold. We feel that this progress will be continued during 1938, most noticeably in the metal mining and power plant industries, both of public utility and private industrial types, these industries being the ones which must purchase new equipment to make up for the long period of dormancy from which they are now emerging. In our own line the most important changes during the past year have

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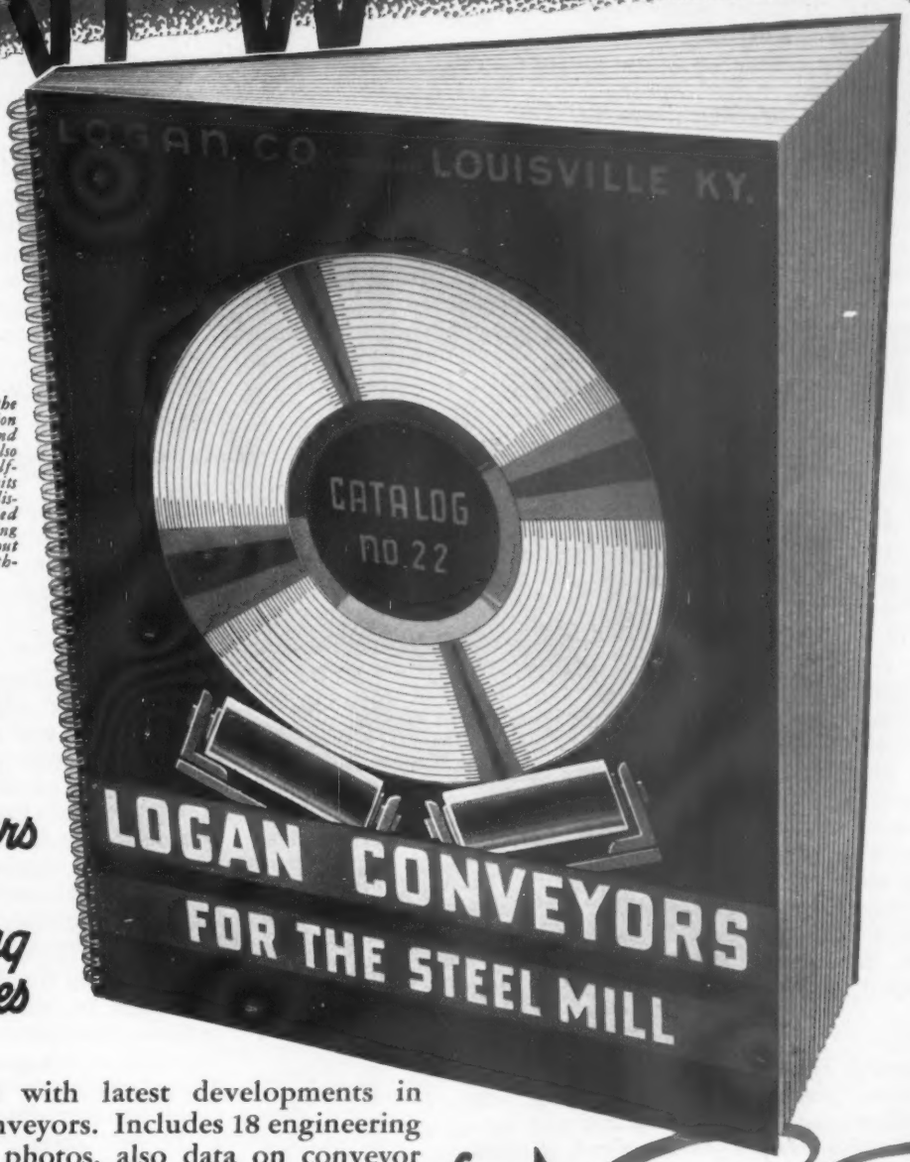

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been wider use of alloy metals and adoption of latest engineering principles, making for efficiency and economy in operation."

Progress in materials handling equipment during the year was largely in the direction of further refinement of existing types. There was a continued trend toward better quality and heavier capacity units. Among the principal developments reported by individual manufacturers are the following:

Automatic Transportation Co., Chicago, developed what it claimed to be the first basically new industrial truck controller in fifteen years. The fundamental change in design is the motor-type brush mounting which is rotary in action instead of stationary as formerly. This is now standard equipment on the company's trucks, tractors and cranes.

Baker-Raulang Co., Cleveland, added a complete line of gas-powered elevating platform trucks with capacity up to five tons. It also developed a new type of controller as standard equipment to prevent starting overloads by requiring an operator to start in first speed and use the acceleration speeds provided. Another new unit is a telescoping 5-ton high lift truck. One of the outstanding developments of the year was a new series of large ram and fork trucks for handling strip.

Mercury Manufacturing Co., Chicago, brought out a new roll-handling truck; a burden-carrying truck with 72-inch long platform; and a new gas tractor originally designed for handling mainliner planes but redesigned for general industrial use; also center-control type fork and ram trucks to provide easy handling, operator's vision and safety.

Yale & Towne Manufacturing Co., Philadelphia, announced a fork-type lift-truck especially designed for handling pigs in the metal refining industry but which may be used also for general work in pallet handling. The forks can be laterally adjusted by a hand crank to handle any length pigs. Important features are two sprocket-hoist chains, each capable of supporting the load. Another item added was a new ram truck for capacities from 4000 to 16,000 pounds, featuring an articulated frame for maximum stability of the truck, loaded or empty.

Dollies mounted on a conveyor chain form the basis for this "merry-go-round" assembly line used in building front end assemblies in the De Soto division, Chrysler Motors Corp. plant, Detroit

W. F. Hebard Co., Chicago, featured a new small gas tractor powered with an International P-12 engine and clutch and small enough to turn around in a freight car.

Towmotor Co., Cleveland, is now using an improved series of engines and has made other improvements leading to faster, easier and more economical operation. A telescopic lifting mast has been added to the line, retaining the same type of carriage roller suspension which has been used on its fixed mast machine.

Roura Iron Works, Detroit, added to its line a new dump hopper for use with hand or power lift trucks for handling raw materials, and especially designed for use with loads which are hot, and for duty where equipment is subjected to high heat.

Manufacturers of batteries and other power units have been keeping pace with the demand for heavier capacities. For example, Electric Storage Battery Co., Philadelphia, recently announced a battery with a cell capacity of 1080 ampere hours at normal discharge rate. This huge battery weighs 2½ tons.

Conveyor Equipment Improved

Conveyor manufacturers have made several distinct contributions to better materials handling practices during 1937, meeting many exacting requirements for heavy duty operations in the steel and metalworking industries. Outstanding among the new developments are the following:

Mathews Conveyer Co., Ellwood City, Pa., made installations in many plants of a newly announced spring mounted conveyor, each pair of rollers being mounted in a cradle which rests on four coil springs to permit motion of the rollers vertically. Each roller is forced to bear its proportionate share of the load. Among other innovations are a right-angle transfer device to receive stacks of sheets and discharge them at right angles onto a processing line conveyor; a new heavy-duty roller; and an anti-friction rubber tired conveyor.

Standard Conveyor Co., No. St. Paul, Minn., improved bearing design to offer better features for lubrication and protection from entrance of foreign elements. All-steel labyrinth grease shields effectively seal the grease within the bearings and at the same time prevent scale or other abrasive materials from reaching the ball races. In power conveyors numerous mechanical developments have been made in connection with power, tilting and upending devices, power brakes and automatic transfer devices.

Logan Co., Louisville, Ky., introduced as one of its developments a side-tilting leveling device for removing coils of strip steel from a trough roller conveyor. The leveling device, which lowers the roller bed to a horizontal position before the side-tilting action begins, is automatic. In operation, coils are held in check by an escapement-type, air-operated brake in the trough line just ahead of the tilting section so that coils may be released one at a time.

Link-Belt Co., Chicago, in its Philadelphia branch plant developed a new type box car loader for handling bulk material with a minimum of dust in the loading operation. An anti-friction belt conveyor constitutes the loading elements of the machine, which has a horizontal boom arranged so that it can be racked back and forth or rotated 360 degrees by

hand. Another innovation in the company's line was a center guide conveyor, using a belt molded with a continuous central guide strip and antifriction idlers having a central roll with a deep groove to confine the guide strip. Improvements have been made in the design and construction of Salem steel elevator buckets.

Jeffrey Manufacturing Co., Columbus, Ohio, developed a protected screw takeup for conveyors and elevators, the adjusting screw being protected from dust and dirt by an inverted U-shaped shield extending from end to end of the takeup frame. Another new device is a precision machine applicable to processes of continuous weigh-feeding, proportioning and batching. A third is a new single-roll crusher designed for preparation of stoker and smaller size coal with a minimum of degradation and oversize.

Chain Belt Co., Milwaukee, reports that changes made on its conveyors during the year have been largely the result of changes in requirements of various industries, such as the necessity for automatically controlled batching equipment in the glass industry. One new development was equipment for continuous removal of settled sedimentation of precipitated solids in suspension. In the chemical industries, many installations were made to convey larger quantities of bulk material in place of packaged material. Electric weighing and discharge control were features where batch weighing was required.

Stephens-Adamson Mfg. Co., Aurora, Ill., added several new belt conveyor carriers, notably a pipe frame carrier and an impact carrier. An interesting development of the past year was a new use for the Redler conveyor, that of dewatering coal and ore. The conveying element travels slowly and if the casing is perforated, it gives the material handled a fine chance to drain most of the surplus water while being elevated to a reasonable height.

The B. F. Goodrich Co., Akron, Ohio, has announced a new conveyor belting featuring cord construction for longer wear, using plies of weftless cords such as are used in heavy-duty truck tires. Among claims are extreme transverse and longitudinal flexibility, and greater resistance to moisture and acid penetration.

Harnischfeger Corp., Milwaukee, lists the following as the improvements made in its line of cranes during 1937: Improved solenoid brakes for hoist motors; improved hydraulically operated foot brakes for travel motors; application of 50 per cent torque brakes on trolley travel motors to prevent excessive drift where roller bearing construction prevails; use of welded steel box section trolley side frames instead of cast iron; use of all welded steel box section bridge end truck frames instead of composite riveted and spreader and cast truck housing construction; operator's cab of all welded steel construction to permit all steel sash mounting, also front lever control arrangement when same is preferred; all welded gears with high carbon rims and hardened where desired; and all welded steel bottom blocks with oil seal lubrication of hook swivel bearing.

American MonoRail Co., Cleveland, introduced for heavier capacities and greater speeds automatically controlled a new line of heavy duty trolleys, switches and cranes for operation over a heavy flange track which can carry loads up to five tons over longer spans. Its MonoTractor has been also fully developed for complete automatic application to carriers, hoists and

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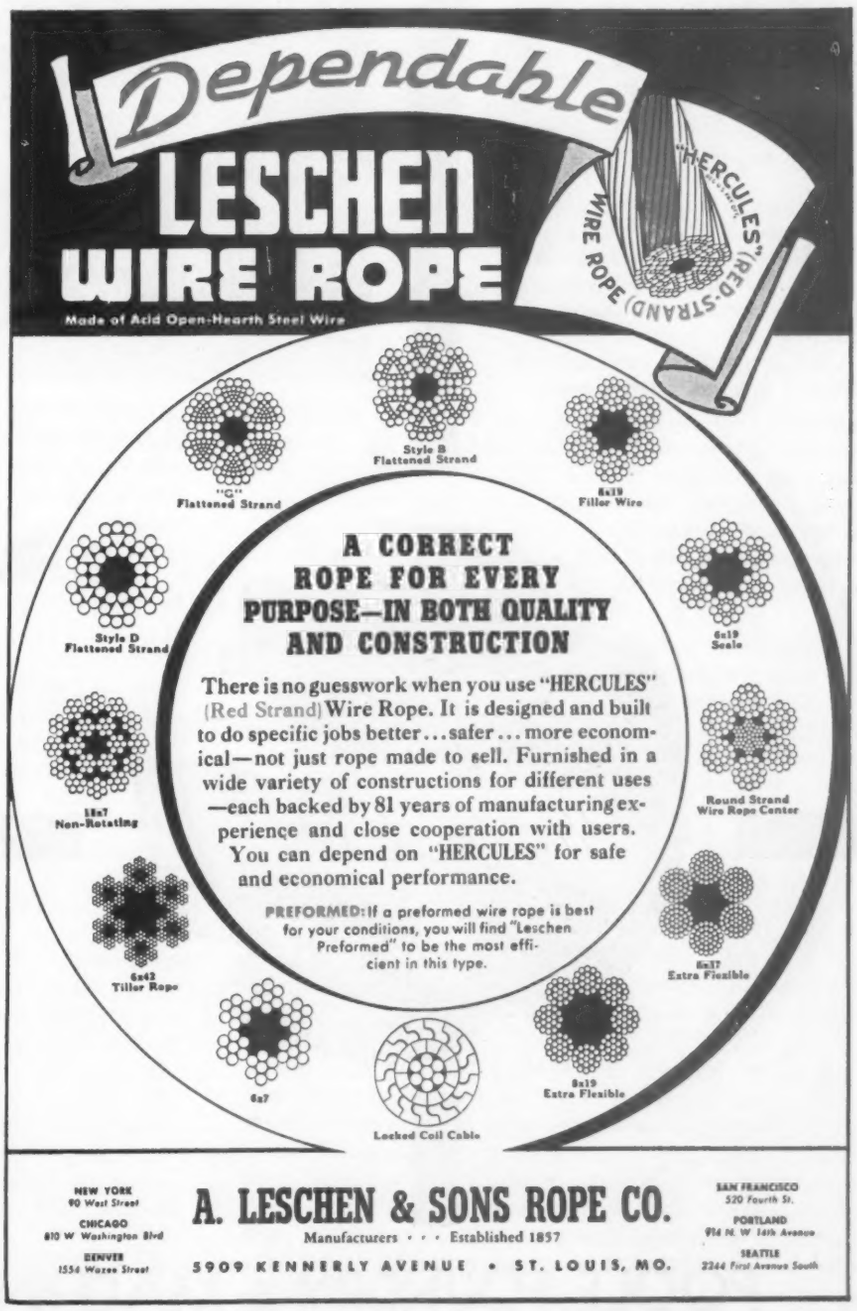
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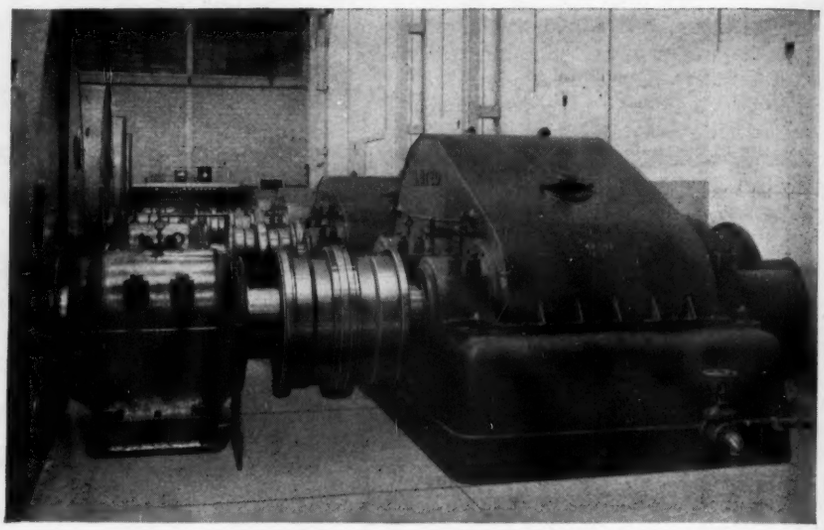

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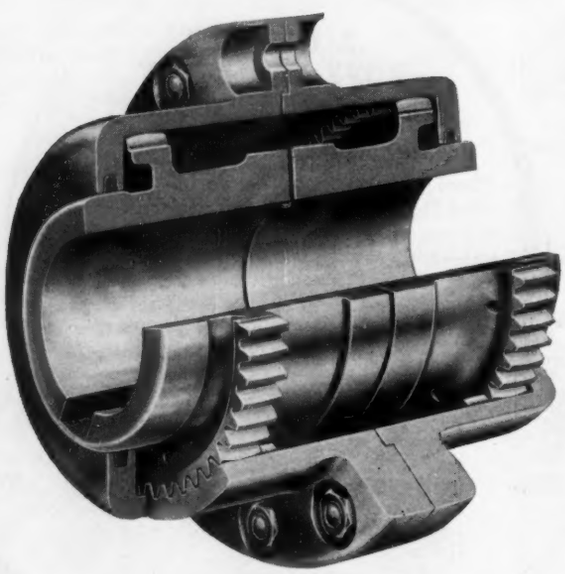

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power drives

■ THE DESIRE and necessity for higher speeds and more power has resulted in a constant development, not only of electric motors but also bearings, belts, chains, lubricants, clutches, couplings, gears, variable speed and hydraulic transmissions and all of the other mechanical elements in connection with the transmission of power from the motor to the machine.

Although most of these devices had been invented previous to the depression that slack period was utilized by many companies to develop and improve their electrical and mechanical power drive products. In almost every case the manufacturer endeavored to produce a unit requiring less maintenance and attention and able to operate with higher efficiency at the increased speeds and loads.

Throughout the history of power drive development the improvement of one type of element has necessitated a corresponding improvement of others. For example, motors necessitated better bearings which, in turn, called for new types of lubricants.

The demands of the automotive industry have been largely responsible for the rapid progress in power transmission elements. The design of better cars and the endeavor to obtain decreased maintenance of cars has constantly kept manufacturers of bearings, lubricants and gears hustling to keep up with requirements. New developments in these items were, in turn, passed on to industry as the car manufacturers immediately wanted to know why such improved products could not be utilized in their production departments.

The few years since the depression have been devoted to the replacement of old and outmoded equipment. In some cases only parts of a drive, such as the bearings, have been replaced; in many instances the entire drive has been changed. Particularly has this been the case with machine tools where the drive is built into the machine. For example, in many modern machines several motors are used with automatic interlocking controls to operate each motor in proper sequence and timing within limits of a fraction of a second or revolution, or decimal of an inch of travel.

Such minute control of machine operation has utilized the developments of the past few years and are imposing requirements which necessitate still further improvement. One of the most outstanding of the newer applications is the wider use of reversing motors. Only a comparatively few years ago electrical engineers were quite proud of designing a motor for laundry washer service able to withstand from seven to ten reversals per minute.

Application of reversing motors placed directly on the spindle of tapping machines and some special-purpose units has required motors which will reverse more often than once per second. Requests have been placed with designers for motors which will reverse as frequently as twice per second.

Supplying motors with short reversal cycles and also those to operate within close limits has necessitated corresponding improvements in control equipment. Manufacturers of control equipment, therefore, have had to completely redesign their units, too. As a result longer life of contacts and quicker operation, with less maintenance and increased reliability have been built, in many cases also smaller and more compact.

The wide use of automatically controlled cycles of operations permit a production speed which was im-

possible to attain by manual control. Also, freeing the operator from attending to the control permits his undivided attention to feeding and removing work.

An excellent example of this is in connection with a milling machine placed on the market about the first of last year. In this machine the table travels to the work at high speed, automatically slowing down to working speed as the tool approaches the work. The table automatically returns at high speed at the end of the cut to work at the other end of the table, which has been set up while the first cut is being made.

Dogs, which may be set at any point on the table, control the entire operation and speed of the table through relays. With this arrangement the tool is milling practically all of the time. Manual operation of these different steps in production would require much of the operator's time and attention.

Automatic welding equipment is another type of machine which shows complicated adaptation of drives to simplified automatic control of timing and motion. Machines are designed which, when started, force the pieces to be welded against each other, stop, turn on the current for a predetermined fraction of a second, open to release the welded parts and return to original position ready for the next loading. The entire cycle is performed in exact sequence and merely requires pushing a button to start.

Much has been accomplished during the past year toward the prevention of vibration and noise from drives. Vibration in some cases with high-speed production equipment affects the finish and accuracy of the product. Better balanced motors have eliminated much of this difficulty. Greater rigidity of frame and balance of all rotating parts have been contributing factors. Improvements in manufacture have silenced gears.

Where excessive vibration is disagreeable to the operators of equipment or the transmission of the vibration to the building or surroundings is objectionable, considerable attention has been directed toward mounting on vibration dampening materials, of which several types are available. Pillow blocks and bearings in rubber mountings have been applied to bearings in the smaller sizes by several manufacturers. These have overcome many of the objections to noise from air conditioning and other equipment for office and home use.

Bearings always have been, and still are, one of the most important parts of a drive. The past year has shown considerable refinement in bearings and extended application of antifriction types. To assure proper lubrication and servicing has been one of the main problems of bearing manufacturers who, after the bearings leave their hands, can only recommend but have no control over these important factors. Machine manufacturers using bearings also face the same problem as both they and the bearing manufacturer are blamed in case of failure.

This problem has led to the production of factory-sealed bearings which are lubricated by the maker and designed to stand up without further attention or lubrication. The problem has been to obtain a lubricant with long life and practically unchanging characteristics under any conditions of idleness or operation. This challenge to manufacturers of lubricants has produced greatly improved lubricants suitable for such purposes.

Spurred on by the demands of the automotive industry for improved lubricants, particularly for hypoid gears, manufacturers have turned to more intensive research on lubricants, their composition and utility, than ever before. This has resulted in greatly improved lubricating oils and greases, not only for the automotive field but for all industry as well.

In the connection of rotating shafts chain manufacturers of both silent and roller types provide their products in alloy steels to obtain greater strength and power capacity with lighter weight. Refinements in precision manufacture and heat treatment also have

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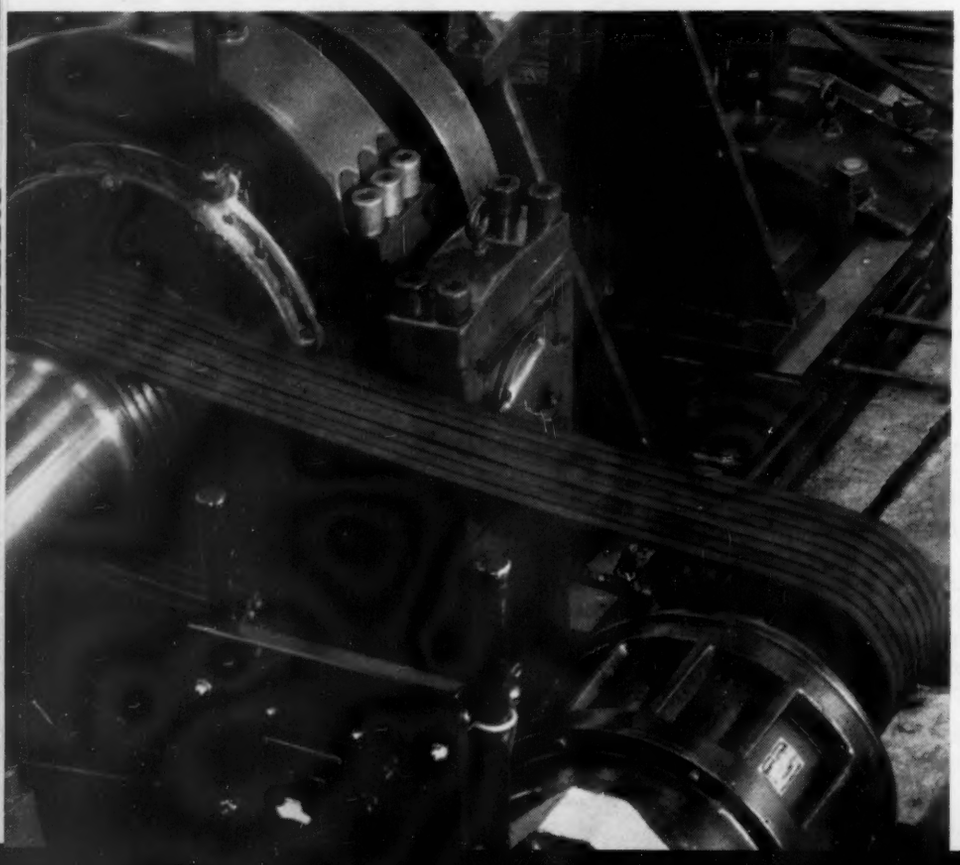

Increasing use of specialized drive applications to effect economies in maintenance and operation has been noticeable this year

welding

■ OF THE MANY new applications of welding and its wider acceptance throughout industry, the outstanding advance during 1937 appears to be the approval of fusion welding in building construction in recently revised building codes of several large cities.

R. B. Lincoln, director of the National Weld Testing Bureau, Pittsburgh, calls attention to the fact that the city of Pittsburgh recently approved the welding of a hospital building utilizing 1000 tons of steel. He says, "We understand that this action will be followed by a revision of the building code providing general rules for welded buildings in Pittsburgh.

"The art and practice of welding," continues Mr. Lincoln, "had been developed to a point where welded buildings were safe as long as 10 to 15 years ago. Several hundred welded, or partly welded, buildings have been constructed during that time with a practically perfect record for safety and durability. Code authorities naturally waited the outcome of this pioneer work before giving general approval.

"The time has come when every city and political subdivision should approve welding and adopt rules governing its use. The action of New York City in approving welded construction will give impetus to this movement," concludes Mr. Lincoln.

Significance of this approval of structural welding is brought out by A. F. Davis, vice president, Lincoln Electric Co., Cleveland, who says, "Outstanding in 1937 was the approval of welding by revision of the New York and Chicago building codes, the former in July, the latter in November. Both permit welding in building construction. This action, in itself a decided impetus to advance of welding, immediately opens up a large potential welding market. Henceforth structural welding will receive greater attention than ever before. Architects, structural designers and engineers, studying design for welded construction, will be able to apply their knowledge to obtain maximum advantages from the process.

"Its advantages," he states, "have already been widely demonstrated. The most recent example was erection of a 200,000-square foot addition to our factory, requiring 1314 tons of steel, all of which was fabricated by arc welding. The design, featuring an all welded rigid saw tooth frame replacing conventional trusses and cross members with a system of framing permitting unrestricted space from floor to roof, was made possible by welding. This method also enabled the builders to complete the structure within three months from the time the first steel was placed. Other advantages of the process, including saving in materials and reduced construction cost, were clearly demonstrated.

"The inherent advantages of welding," adds Mr. Davis, "have led to its adoption for the manufacture of all sorts of products. Highspotting the year 1937 we find . . . . A metal furniture manufacturer changed over to arc welded construction and reduced his costs $30 a day . . . . A shipyard turned out a 300-foot arc welded cargo vessel which had 300 tons greater capacity because of arc welding . . . . A 300-mile oil pipe line was constructed in 70 days, every joint arc welded . . . . A machinery manufacturer, adopting arc welding, produced stronger, more durable machines at 30 per cent less cost . . . . A railroad car builder reduced the weight of passenger coaches 35 per cent with welded construction . . . . An auto-

Production welding operations become more commonplace each year. This butt-welding operation on a steel rim is typical of machine welding operations

mobile manufacturer began production of complete arc welded chassis frames.

"These examples typify welding progress. The advance will continue steadily without doubt. To facilitate this advance and to stimulate study of design for arc welded construction, the James F. Lincoln Arc Welding Foundation is offering 446 awards totaling $200,000. The contest is open to practically everyone in the construction field."

Welding continues to play an increasingly important part in large construction enterprises. The Golden Gate bridge, while not itself welded, employed welding to a large extent in its erection. Contractors are depending more and more upon welding as a maintenance tool. A good welder can repair almost anything so that it is not only as strong as before but can do it so quickly that the equipment is out of production only a short time. Boulder dam was another large project where welding played an important part. Much of the equipment going into this construction was fabricated on the job.

A larger portion of heavy earth handling machinery constructed in 1937 utilized welded construction not only for maximum strength so necessary to this equipment but also for the decrease in weight welded construction permits. Low alloy high strength steel and welded construction were employed exclusively in lines manufactured by several producers of this equipment.

Taking a peek into the future, J. W. Meadowcroft, assistant works manager, Edward G. Budd Mfg. Co., Philadelphia, predicts: "Because much more progress has been made both here and in Europe on oxyacetylene and electric arc welding than on electric resistance, a new electrode material will be developed that will add to the life of contact electrodes for spot, flash and seam welding. This will increase the use of resistance welding.

"Transformers for resistance welding will be standardized by manufacturers of this type of equipment, and such standards will be approved by the American Institute of Electrical Engineers and the American Welding society. Timers will be so improved that industry will be using them exclusively. Portable spot welding equipment will also be greatly improved," concludes Mr. Meadowcroft.

Alloy Welding Expands

The year 1937 saw welding advance in many other fields. Procedures were successfully developed and standardized for flame cutting and welding many of the low alloy high strength steels recently developed. The use of these alloy steels in conjunction with welded construction enables full advantages of fabricated steel construction to be utilized in that maximum strength with minimum weight, placing of highly stressed members where required and production of structures of extreme stiffness are all facilitated by this combination.

Stainless steel welding and cutting was extended to cover many new applications. A new cutting procedure where the flame is applied from the base metal side promises to speed up this operation and to eliminate a large amount of the decrease in corrosion resistance experienced at the edge when using older methods of cutting with the oxyacetylene torch.

Bronze welding also received considerable impetus during 1937. This was partly due to the perfection of improved welding rods and partly to newer methods of application to types of work heretofore not attempted. As a means of repairing heavy castings it is coming into wide usage.

Another field which underwent expansion was the application of hard surfacing metals. Many new types were offered to users and, along with better alloys, a better understanding of factors involved in their successful application opened up new fields till today sees hard surfacing used in wide variety as cutting tips for machine tools, cutting surfaces on plows, thresher machine blades, road machinery, dipper and bucket teeth, tractor shoes, and many other parts undergoing high rates of wear or where metal surfaces of maximum hardness and toughness are required.

Dr. George V. Slottman, assistant manager, applied engineering department, Air Reduction Sales Co., New York City, in speaking of welding strides says, "Looking into the future, the most significant de-

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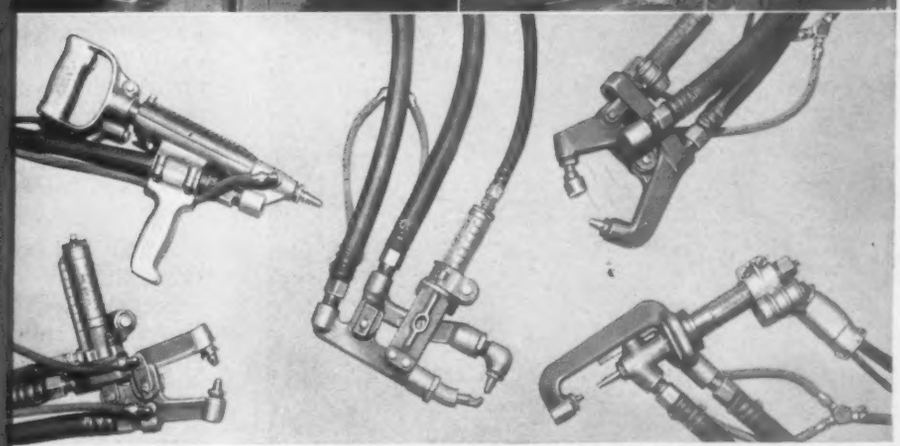

UPPER LEFT Hydraulic Punching Units — UPPER RIGHT Hydromatic Welders — LOWER Portable Hydraulic Welding Guns

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velopment in 1937 was the allowance of structural welding in the newly revised building code for the city of New York. Since this code serves as a model for many municipalities throughout the country, this approval means the scope of fabrication by torch cutting and arc welding will now be extended into the heretofore untapped structural field, a trend of far reaching importance.

"In the nonferrous field, considerable increase in the use of silver solders and of low melting copper alloys was noted. Silver solders are emerging from the jewelers' shops and are becoming a common production material. In the fabrication of bus bars for large power stations, a typical example, permanent low resistance joints between bus bars are obtained at moderate cost, yielding a structure superior to that obtained with mechanical joints," concludes Dr. Slottman.

"The Metal exposition at Atlantic City in October," points out P. G. Lang Jr., president American Welding society, "illustrates the continuing trend toward the expansion of welding and cutting in all phases. There was a pronounced increase in the display of welding appliances compared to a year ago. Improvement in machines for automatic flame cutting was strongly marked as was also the development and multiplication of shop accessories designed for automatic or mechanical welding. Throughout the field of mechanical appliances, the stimulated interest of manufacturer and user is unmistakably apparent.

"Another evidence of this aroused interest is the increased attendance at the annual convention of the American Welding society this year compared to previous years. Increased membership in the American Welding society demonstrates a deep personal interest in welding on the part of professional men. "At present," concludes Mr. Lang, "it appears that the practical side of welding is somewhat in advance of the development of the theoretical side although a vast amount of important basic research work has been done and will continue to be done by the welding research committee which is organized under the Engineering foundation."

Most important advance in the welding field was adoption of municipal welding codes allowing fusion welding in building construction

Qualification of procedure and operators received detailed study during 1937. F. Eder, Robert W. Hunt Co., New York, states: "I consider the importance assigned by welding engineers and code making authorities to the necessity of requiring qualification of the welding procedure in addition to the welding operator an outstanding development. Qualification of process or procedure consists of various tests made with same materials, apparatus and equipment as in actual work to be done. After this, operators are qualified by relatively simple tests indicating their ability to make sound welds under conditions specified in the welding procedure for the job at hand."

"As would be expected, the use of flame cutting and fusion welding in construction of machine tools has greatly increased. It is interesting to see the adoption by a large conservative machine tool builder of an all-welded rolled steel base for one of its large machines. This trend to welded steel construction seems likely to be one of the most influential," comments E. S. Ault, professor of machine design, Purdue university, Lafayette, Ind.

Speaking of welded machine tool construction, Robert E. Kinkead, well known consulting engineer, Cleveland, states: "Recent design of machine tool equipment of welded structural shapes and plates with enclosing streamlined covers to keep the dust out of the mechanism represents perfectly sound and logical design." Rolled steel and welding have been employed in a number of cases to produce machine tools with less deformation under load as such construction can easily be made extremely stiff, a factor assuming increasing importance as higher precision is required in new designs.

New Rivets Standardized

As to replacement of riveting by welded fabrications, there does not seem to be as much as might be expected since rivet sales are keeping up well. Welding, while replacing a certain amount of riveting, is largely employed on new fabrications and assemblies as it makes possible development of types heretofore impractical.

Developments in rivets included a new type of rivet known as the high button head or acorn head, recently standardized, according to Pierre Champion, president, Champion Rivet Co., Cleveland. He says: "This type of rivet, we feel, will become very popular as it has been used extensively for a number of years by a few private concerns both for structural and pressure boiler riveted construction. The advantage of this new high button head is that, during course of driving, initial driving effort is centered on top of the head. This tends to upset metal in the shank of the

(*Please turn to Page* 380)

progress in steelmaking

■ RECESSION in the steel business in the closing months of 1937, after nine months of full speed ahead, brought back to the industry the same problems that faced it in 1932-3. But the recession was not wholly unattended by benefits.

"During this time, if industry is wise, furnaces will be rehabilitated," says L. F. Reinartz, American Rolling Mill Co., Middletown, O., and chairman, open hearth executive committee, American Institute of Mining and Metallurgical Engineers. "This now can be done at relative low cost and without serious operating delays. We should prepare for the day of high production which the unsatisfied demands of the American public will again make possible as soon as the present maladjustment has run its course."

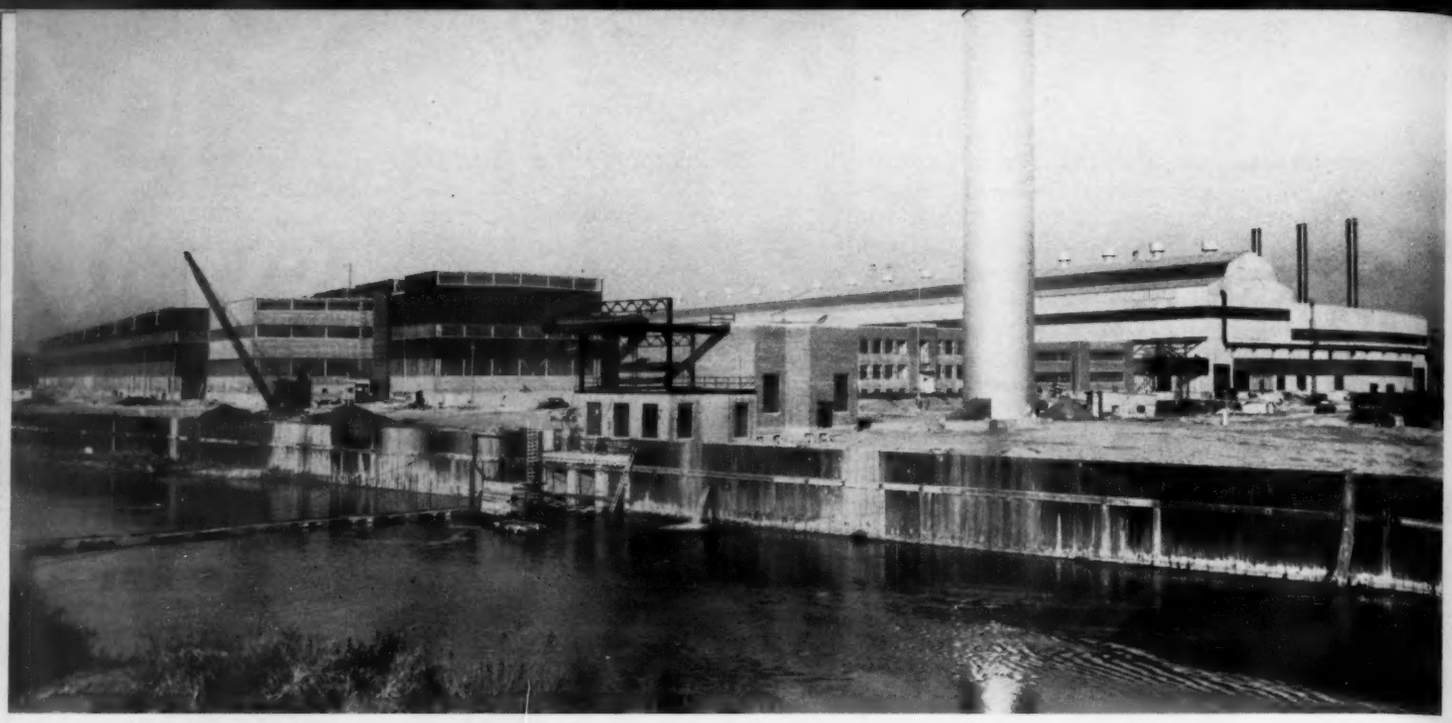
Commenting on the year's developments in the open hearth field, Mr. Reinartz says: "Attention was focused on the hindrances to rapid charging of furnaces. Studies were made to find out how to improve track layouts and how to increase charging equipment, such as wider charging pans, more charging cars and improved charging machines. Technique of scrap preparation was investigated to increase weight of scrap per ton. A distinct tendency was noted to use better grades of scrap to get more weight per pan, less oxidation and faster charging. A better yield resulted.

"Some plants, to increase total shop tonnages, used existing bessemer converters for a preliminary blow to reduce silicon and manganese before pouring the hot metal into the open hearth furnace. This practice increased pig iron percentage when scrap prices were high, and increased tons per hour of existing furnaces with attendant decrease in cost. In parts of the country where pig iron is not available, installation of cupolas to furnish hot metal for open hearth furnaces by melting cast iron and scrap has been seriously considered; if results are as good as those obtained by a Chicago cast iron wheel manufacturer, this innovation should be desirable.

"Quite a number of new large open hearth furnaces have been built. Insulation now is standard with furnace linings. Insulation of furnace roofs still is a subject for debate. Bulkheads laid up of metalkase brick or olivine rock have given excellent results. There has been little change in automatic control of open hearth furnaces. Some open hearth men had good success in placing a special mastic compound between the basic or neutral brick of the furnace hearth and the sintered bottom. To increase economy of operation, tendency has been to tap as large a heat as a single ladle, runway and ladle crane will carry. For quality steel production most operators believe bifurcated spouts add variables that interfere with quality control. Welded ladles are coming more into use.

"An important development is slag control; various methods are used. Experiments are in progress at several plants in the use of high purity American ferromanganese. Special explosives have been used with considerable success in removing slag from slag pockets. Wide strip mills continue to find segregation in large, wide slab ingots a problem."

Continued improvement of slag control methods and the extensive use of automatic control equipment featured open hearth practice in 1937, says W. J. Reagan, Edgewater Steel Co., Oakmont, Pa. "Two lines of thought are the basis for most slag con-



Principal buildings in the mill group of Republic's new 98-inch continuous strip mill, located about a mile up the Cuyahoga river from the Corrigan-McKinney open hearths in Cleveland. The mill is scheduled for a formal opening early this year

trol work," says Mr. Reagan. "One endeavors through simple methods of control and conventional analytical procedure to confine slag analyses and fluidity to rather narrow limits. The other consists of a somewhat more complicated scheme endeavoring to control slag composition by visual examination and study of the appearance of slag samples. Both have their advantages and disadvantages.

"Much apparatus for mechanized control of the open hearth has come into general use. Among instruments in use in a recent installation are: Gas and oil indicating, recording flowmeters; indicating, recording, steam flowmeters; flowmeters for indicating and recording combustion air to each regenerator unit; indicating gages for furnace pressure and flue draft; furnace pressure regulators for atmosphere control; roof temperature control by radiation pyrometers. Automatic fuel-air ratio control on one furnace gives good results. Most unusual is the metering of all water, compressed air, steam, and gas on standard recording flowmeters. This installation has shown a profit."

Charge Is Loaded in One Operation

W. G. Hildebran, Wellman Engineering Co., Cleveland, states that this company's engineers have developed a method whereby an entire charge of cold metal may be placed in the open hearth furnace at one time, using a charging machine with large pan and a furnace with removable front. This company acquired rights to manufacture and sell top charging open hearth furnaces invented by John O. Griggs and Herbert H. Leeks. Open hearth charging machines now under construction have capacity as high as 12 tons. Increasing use of self sealing coke oven doors requires great precision.

Charlton Reynders, president, International Chromium Process Corp., New York, feels improvements in slag control and grain size control methods are of importance. From a practical operating viewpoint a development which impressed him is the archless frontwall whose use is increasing.

Dr. E. G. Hill, director of research, Lukens Steel Co., Coatesville, Pa., cites five categories in which furnace practice has improved: Rapid determination of SiO_2 in open hearth slags for control; greater refinement in pit practice by controlling pouring rates, using special type corrugated ingots and by better hot top practice; adoption of plant methods for testing refractories; better sizing and smaller sizing of bottom materials; education of melters in open hearth chemistry.

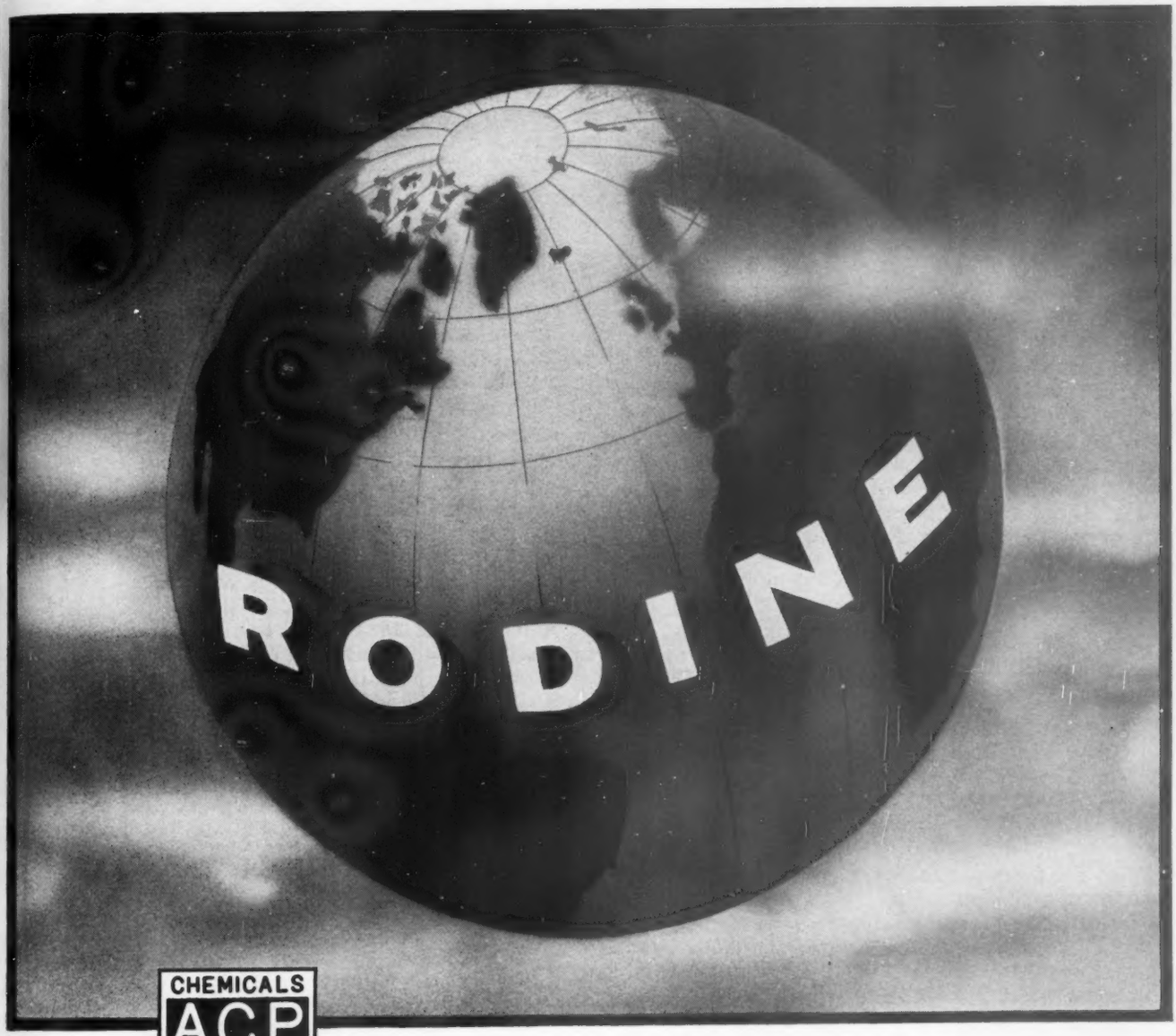
George L. Danforth Jr., president, Open Hearth Combustion Co., Chicago, cites among improvements a new water cooled, tapered, door frame for open hearth furnaces. Its legs are sloped to give a wider opening at top than at bottom, facilitating charging and affording more protection to furnace men.

Oxacetylene Deseaming Progress

"Steel mills have seen universal acceptance during the past year of the oxyacetylene torch for deseaming slabs, blooms and billets," says Dr. George V. Slottman, Air Reduction Sales Co., New York. "Introduction of machines to completely desurface steel stock at rolling heat on the mill roller lines has completed one phase of the development of the oxyacetylene torch as a rough machining tool."

C. D. King, United States Steel Corp., 71 Broadway, New York, regards as interesting trends in blast furnace practice, continued installation of furnaces with capacity for 1000 tons or more, use of modern and large blast furnace stoves and higher blast heats and the external desulphurization of pig iron. He regards the growth of automatic control equipment, further refinement in the application of slag control and the extended use of basic brick in Europe for furnace roofs as the most interesting recent trends in open hearth furnaces.

Owen R. Rice, Freyn Engineering Co., Chicago, cites as a notable development a new bypass valve



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for equalizing gas pressure above and below the large bell just before the latter is lowered. William Johnston Jr., president, Steel Industries Engineering Corp., Pittsburgh, comments on the value of a new pig casting machine in which the wheels are stationary and mounted on roller bearings, reducing maintenance.

A. J. Boynton, vice president, H. A. Brassert & Co., Chicago, believes the method for desulphurizing pig iron at Corby, England, has wide possibilities. Required for basic bessemer steel, the product there ranges 0.25 to 0.35 in silicon, 1 to 1.75 in manganese, 0.07 to 0.08 in sulphur and around 2 per cent phosphorus. This iron is made from 33 per cent local ore high in alumina and sulphur.

"To make possible a slag suited to the manufacture of low silicon iron, and permitting a smooth operation in contrast to the irregularity which must always exist where attempts are made to fulfill two irreconcilable conditions at the same time,—in this case a cool hearth for the sake of the low silicon and a hot one for low sulphur—desulphurization outside of the furnace was attempted," says Mr. Boynton.

Iron Is Desulphurized Externally

The Corby furnaces operate with a practice by which they are burdened and slagged with complete indifference to the sulphur content of the ores or the pig iron. Sulphur is reduced from 0.10 to 0.50 per cent in the pig iron to about 0.06, low enough for the basic bessemer process, by treatment with a compound of 50 crushed limestone, 25 soda ash and 25 per cent fluorspar.

"The chief desulphurizing agent," says Mr. Boynton, "is the sodium. The primary reaction results in formation of sodium sulphide with liberation of oxygen. Secondary desulphurization effect exists either through the substitution of calcium for sodium as a base for the sulphide, or by oxidation of the sulphide sulphur by atmospheric air with a second desulphurizing reaction into which the sodium enters. A secondary reaction must occur since the sulphur removed is more than can combine with the sodium present. The amount of mixture used at Corby averages 2.4 per cent of the weight of the iron. The other ingredients serve to form a slag which is of desirable consistency and which will not attack the ladle lining. The reaction is carried out by placing the mixture in the bottom of a hot ladle provided with a cover; with hot iron and a hot ladle the effect is much more pronounced than with an open topped ladle and cold iron.

"This practice has shown other advantages beside desulphurizing and may be used to advantage even where desulphurization may be effected by other methods. At the temperature of the ladle, the carbon dioxide gas resulting from the calcination of the carbonates has two effects. First is a physical cleansing of the iron from minute particles of contained slag. Second results from a breaking up of the carbon dioxide into carbon monoxide and oxygen. The oxygen preferentially unites with the silicon and has comparatively little effect on the manganese and none on the carbon. Removal of silicon is about 28 per cent in iron containing 0.80 per cent silicon. This effect permits the operation of the furnace at considerably higher silicon content than is desired in the iron. Both these secondary effects are important in the basic bessemer practice at Corby.

"The silicon in the iron going to the steel works has been increased so that it more than makes up for reduced manganese and phosphorus content so far as temperature is concerned. The process consequently is conducted at a higher temperature, with practically complete abolition of slopping and a minimum of spittings, since the reduction in the quantity of manganese makes a stiffer and more viscous slag than otherwise would be the case. One advantage of the higher temperature is an earlier combustion of carbon, with retention of a part of the silicon until the carbon blow is nearly completed, with consequent deoxidizing effect late in the blow and an improved quality of steel.

"Possibility of applying these practices to blast furnaces in this country is interesting. While there is no present manufacture of steel by the basic bessemer process and no manufacture of iron with ores so difficult as those at Corby, there are circumstances in which it seems that modification of blast furnace practice would be profitable. Experimentation on a practical basis is now proceeding to see what results can be obtained both with regard to desulphurization and with regard to beneficiation of steel made from treated iron."

Another recent development, says Mr. Boynton, is a technique for affording partially dried blast at moderate cost both for installation and operation. Moisture is absorbed by passing the air through a solution of lithium chloride contained in a system of vertical parallel strings which act as wicks. An apparently successful departure from the straight tuyere, says

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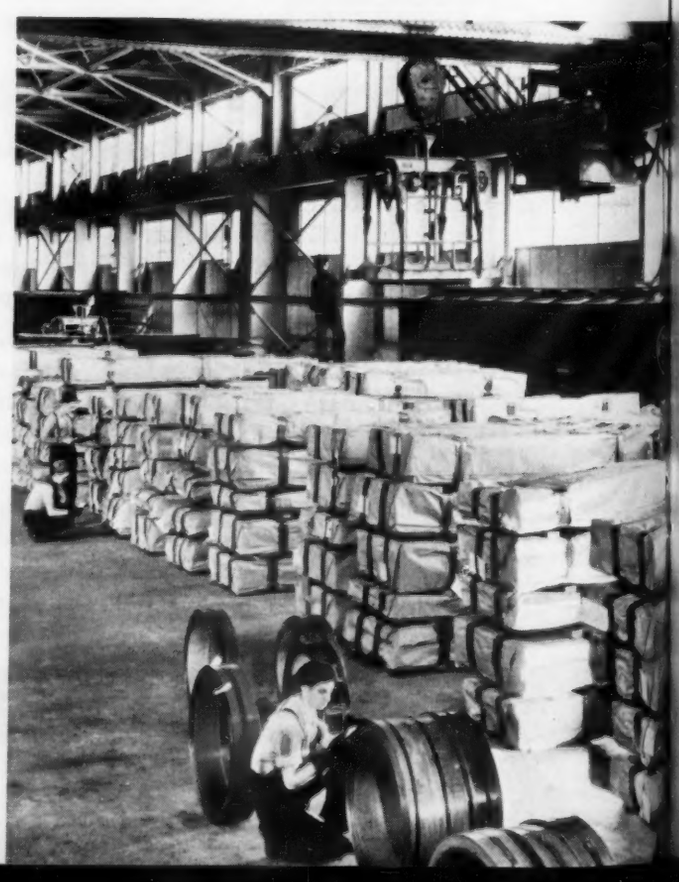
Money is saved for the customer by wrapping bundles of sheets in waterproof paper and strapping them with wire or steel bands in the plants of progressive steelmakers. Photo courtesy Jones & Laughlin Steel Corp., Pittsburgh



Their Forming Rolls Took

FOUR HOURS FOR LUNCH!

Read how Shell Cut Shutdowns to a Minimum

MEN OR MACHINES—you can't let them take 4 hours for lunch and keep production at par!

The Stubnitz-Greene Spring Corporation of Adrian, Michigan, manufactures automobile cushion springs and frames. Cushion frames are fabricated from strip steel passing continuously through a series of forming rolls. Improper lubrication was keeping these rolls idle 20% of the time—more than 4 hours a day!

Foaming of the soluble oil in use was resulting in a great loss of lubricant through splashing. Insufficient lubricant in the emulsion was causing the strips to jam, and scrap losses were mounting. Shell was asked to help solve the problem.

A complete survey of the machines and operating conditions was made. Then, drawing on their experience in the steel industry, the Shell engineers made their recommendation. A Shell Soluble Oil, with the proper proportion of water, was applied.

In use by Stubnitz-Greene for one year, this lubricant has a remarkable record. While easily washable from frames, it has shown no tendency to foam and has lubricated so well that scrap loss has been minimized and "down" time of the machines reduced to an all-time low.

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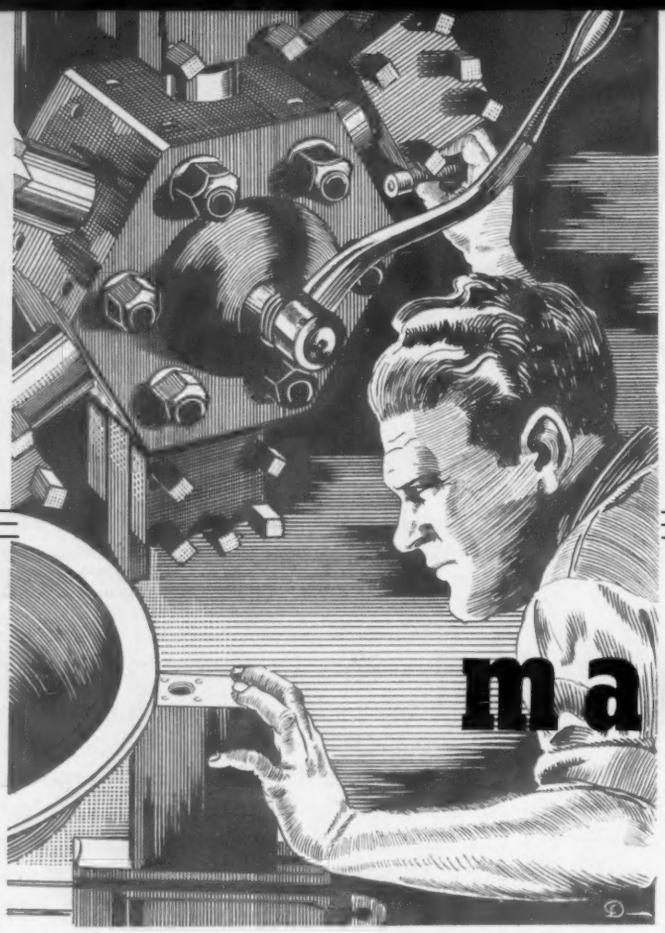


machining

■ ALTHOUGH increased production accompanied the majority of machine tools developed in 1937, outstanding features included considerable progress toward higher quality and greater precision in work handled. Design and grouping of controls for more convenient operation was also seen. These factors in conjunction with the increased use of antifriction bearings and generally heavier construction resulted in more reliable and consistent performance.

As J. R. Weaver, director equipment, inspection and test, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., points out, the machine tool industry experienced an exceptionally good business the first part of 1937 due to increased activity in practically all lines creating a demand for more modern machinery. "Furthermore," states Mr. Weaver, "the demands of labor for increased wages have in most cases made it easier to justify more modern facilities.

"Most new equipment was purchased for expansion and new designs. I do not believe there has been much machine tool replacement during the last six or seven years. Thus many industries have a much larger percentage of obsolete equipment than 10 years ago.

"The tendency today seems toward increasing use of electric drives and control. Elimination of mechanical operations and mechanisms is usually accompanied by improved operating efficiency. Another factor entering into the design of new machine tools is the lack of skilled operators, a situation becoming quite serious in some localities. Machine tool manufacturers are keeping this in mind and generally take whatever steps may be necessary to have the machines lend themselves to operation by semi-skilled help.

"As to the future," continues Mr. Weaver, "I believe we are on the verge of a decided expansion in many industries. Also, new industries will be rapidly developed. I have in mind air conditioning and television. Air conditioning will undoubtedly be in demand almost to the same extent as radios, refrigerators and other household appliances are today. Television may radically change our method of living as theaters may be eliminated entirely necessitating reconstruction of homes to accommodate motion pictures, news reels, etc. to be shown at home.

In conclusion, Mr. Weaver says: "I really believe business will pick up in 1938, creating a much greater demand for machine tools and manufacturing equipment than we had in 1937 and offsetting increases in costs occasioned by wage increases, taxes, etc."

Regarding machine tools in the automotive industry, D. A. Wallace, president, Chrysler Sales division, Chrysler Corp., Detroit, states: "Although there are some new machines that accomplished unusual results, on the average most of the production machines remain complicated and of intricate design requiring the best possible skilled workmen in making adjustments and maintaining the electrical equipment. In general, it is my thought that equipment delivered in 1937 was much heavier, resisted vibration to a greater degree and was simpler and neater in appearance than in the past. Electrical and hydraulic apparatus was generally more accessible. Higher quality and greater precision were the outstanding characteristics of the newer machines.

"One of the difficulties with the average new machine that uses coolant or cutting compounds is the lack of a simple and effective design to keep these compounds thoroughly filtered without having a disorderly condition due to removal of chips and waste material as well as overflow of the compound.

Removal of residue and chips still remains a wheelbarrow job that does not permit maintenance of an orderly condition around the machines. Real development work could be done here using some type of overhead conveyor, vacuum suction or pressure blower system. There is a real need for such equipment, reasonable in cost and satisfactory in operation."

Commenting on strides made during 1937, Mr. Wallace advises: "There is a continued trend to broaching due to the simplicity of the operation and the speed and precision with which work can be performed."

Improved Methods Reduce Break-in Period

One of the problems of the automotive industry is to machine parts to eliminate the break-in period or confine it to a minimum length of time. "It is becoming increasingly necessary," points out Mr. Wallace, "that the finishes in cylinder bores, on piston surfaces, cam surfaces, crankshaft bearings and other working parts have the initial wear eliminated by removal of deep scratch marks left by present finishing methods. This requires special equipment for lapping these surfaces at little or no increase in production cost. Improvements have been made recently resulting in longer life to the motors and other parts where there is a tendency for wear to remove tool marks thus increasing the initial clearance that is necessary to allow on fitted parts.

"New equipment developed for lapping bores, cams, tappet faces, brake drums, etc., appears to be very substantial, simple to operate and accurate in result. It performs with such rapidity and accuracy as to permit lower costs.

"To obtain accurate lapping results, it is necessary to have an instrument to reveal and measure defects on all types of surfaces. This work has been facilitated by the recent development of simple and foolproof apparatus with which it is possible to measure in millionths of an inch in regular production work. The apparatus gives direct readings or records on a chart and reveals lines and scratches as fine as one millionth of an inch." In conclusion Mr. Wallace says: "No doubt 1938 will see much progress in lapping equipment and methods."

"Surface grinding has been much improved by the application of hydraulic control to the work table," according to W. Hartman, vice president in charge of engineering and production, National Cash Register Co., Dayton, O. He continues, "This makes possible heavier feeds and eliminates most of the vibration and shock to the machine, thus increasing its life."

Speaking of the rapid strides in broaching, Mr. Hartman says: "Surface broaching is gaining popularity because it provides almost continuous cutting time, through hydraulically operated alternating broach carrier and oscillating work table. Fixtures are designed to hold two pieces of work, one piece being broached while the other is being loaded.

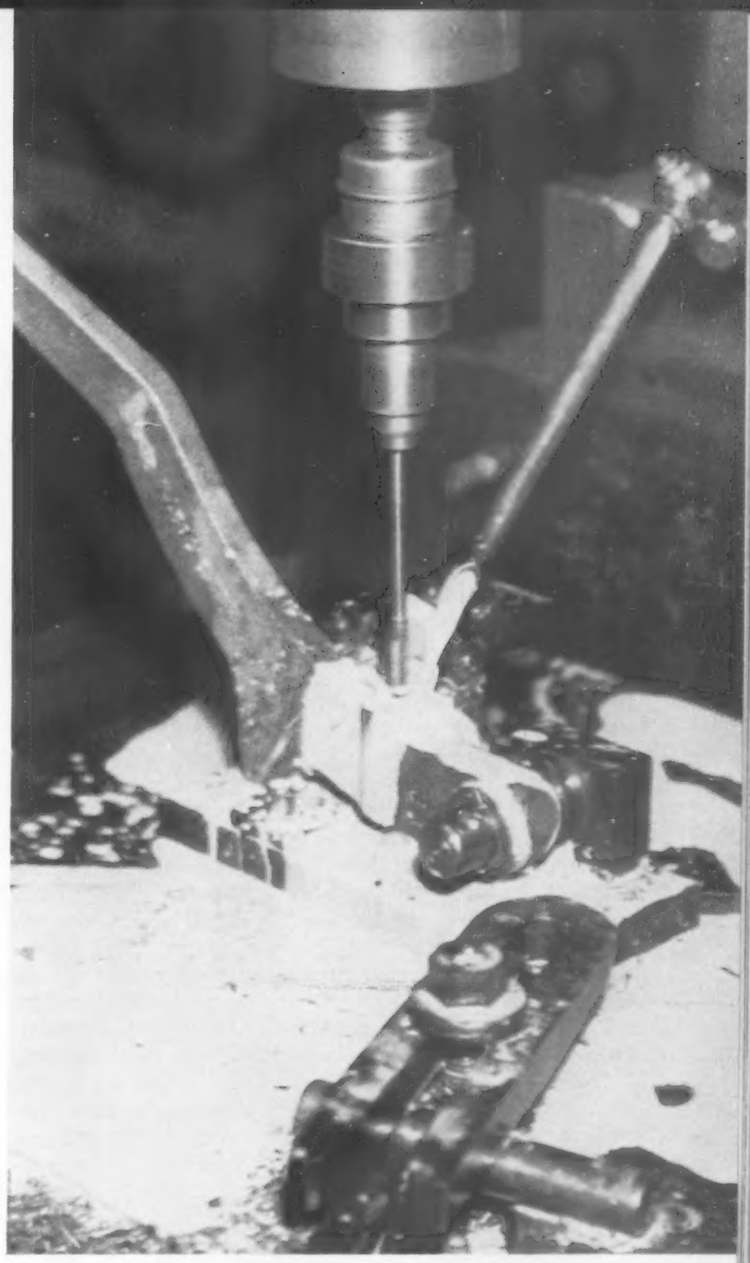
"A new broach grinding machine has been a large factor in the progress of surface broaching. It is equipped with a finger locater that automatically locates the grinding wheel in relation to the next tooth. This insures uniform grinding, increasing the efficiency and adding to the life of the broach.

"Boring machines have been improved by using an alternating cutting method similar to the surface broaching machine. This has eliminated most of the idle machine time.

"New automatic screw machines have been modernized by changing the spindle bearings from bronze to the frictionless type which allows much higher spindle speeds to be used. Increased speed of indexing has reduced idle machine time, also."

Referring to the trend toward the use of antifriction bearings, John H. Baninger, assistant chief engineer, New Departure division, General Motors Corp., Bristol, Conn., advises: "It is very gratifying that during 1937 the swing toward the adoption of anti-friction bearings in machine tools has gained considerable momentum with satisfactory results both from a manufacturing as well as service standpoint.

"The totally sealed ball bearing, lubricated for life, is being widely adopted because maintenance cost in re-lubrication is eliminated. Such bearings are also fully self-protected against entrance of dirt



Wider use of antifriction bearings and heavier construction of machine tools has led to higher and more accurate production in machining operations. Photo courtesy White Motor Co.

and dust, an important feature during installation.

"A new series of extra light ball bearings conforming to metric dimensions has been developed this past year and is expected to become an international standard. This series permits the use of heavier shafting, and since the introduction of Carboloy and other high speed cutting steels new machine tools have been developed to operate at higher speeds. This series of bearings should meet the requirements of the trade as a type suitable for use in replacing plain sleeve bearings."

Another development in 1937 is the increasing use of needle bearings, a roller bearing with rolling elements of comparatively small diameter and considerable length. These are being used in some designs as interchangeable with sleeve bearings since it is possible to make their overall dimensions approximate those of equivalent sleeve bearings.

The changed appearance of many of the newer machine tools is commented upon by E. S. Ault, professor of machine design, Purdue university, Lafayette, Ind., who says: "There has been a decided 'cleaning-up' of machine exteriors. This has been accomplished by enclosing functional and control parts and by achieving a pleasing appearance of solidity through attention to line and proportion. An encouraging factor," continues Prof. Ault, "is that much of this is due to engineers, the trend not being entirely due to industrial stylists. Along with this is the new practice of enclosing the work, as exemplified by some of the recent gear finishing machines where enclosure promotes safety as well as appearance. The wide spread use of hollow headed set screws to eliminate obtruding bolt heads is another example of the tendency to clean up exteriors.

"Much attention has been given to reducing the time required for setting up and changing over machines. Also thought has been expended in making replacements and adjustments quickly. Convenience of operation and repair are no longer incidental but are designed in the machine.

"Numerous mechanical, variable speed transmissions and drives have been adopted as integral parts of machine tools making possible more efficient operation through the use of correct speeds for the various operations. Another trend is toward the adoption of V-belts for internal drives, sometimes replacing gears. They are also adopted to reduce shock and vibration, one of the problems on certain types of high precision work."

In agreement with other comments, Professor Ault believes: "Aside from increased production rates, the advances in machine tools during 1937 seem to be largely in design refinements for more convenient and reliable performance."

"The machine cutting field," comments Dr. George V. Slottman, assistant manager, applied engineering department, Air Reduction Sales Co., New York, "has been characterized by a rapid development during the past year. Manufacture of oxyacetylene cutting machines is assuming the proportions of a small scale machine tool industry. Machines are being designed with increasing emphasis on stability, quality of cut and dependability. In general appearance they are approaching the precision machine tool. Previously regarded solely as motorized hand torches which could be transported to the work, they are now being considered from the standpoint of a permanent machine located on a production line with suitable handling facilities to regulate the flow of material to and from the machine. A continuation of this development and consequential increase in the use of oxyacetylene cut and fabricated parts is inevitable."

Reviewing 1937 advancements, C. J. Stilwell, vice president of The Warner & Swasey Co., Cleveland, calls attention to the pre-selector, a device which puts turret lathe work-speeds on a surface feet-per-minute instead of spindle revolutions-per-minute basis. He points out, "The establishment of the pre-selector, the development of the power operated chuck wrench and

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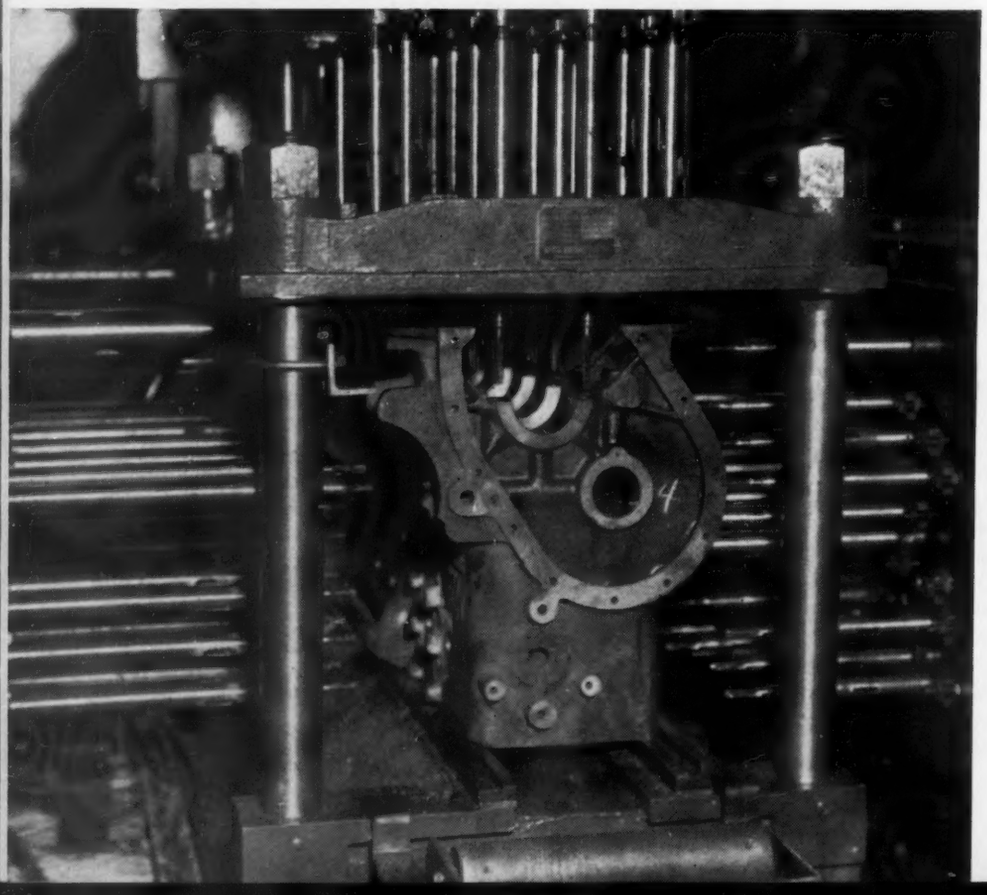

Noticeable during the year 1937 was the increase in multiple operations in the attempt to speed up production at lower cost. This multiple tapping machine is pictured in operation at the plant of White Motor Co.

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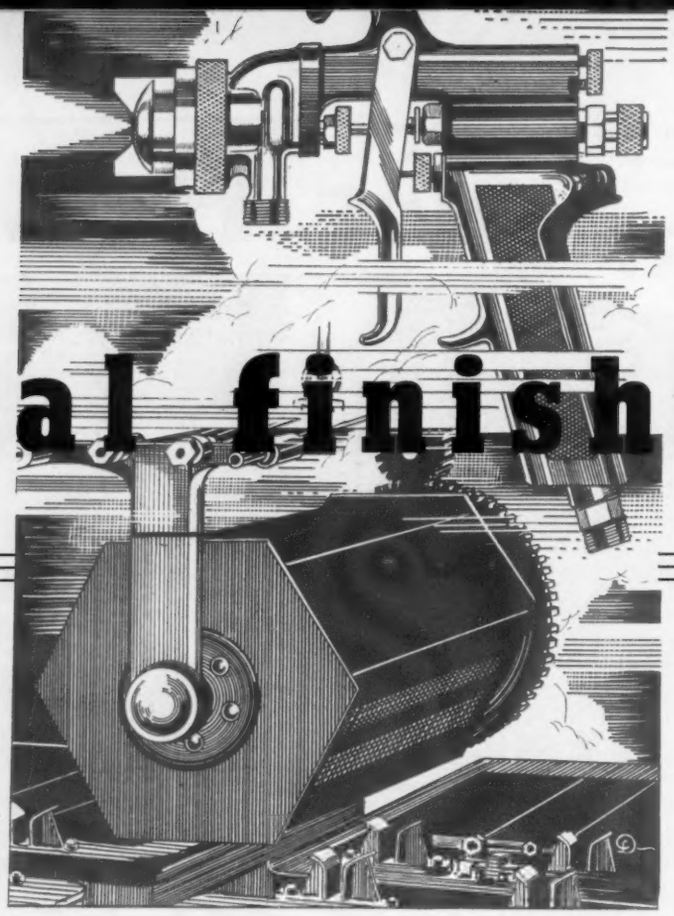

■ THE YEAR 1937 was an unusually good one for the advancement of metal finishing according to leading authorities in this field. To manufacturers heeding this progress the way toward stimulated sales of metal products through superior, lower cost and more attractive finishes is indicated.

In commenting on progress in the endless fight against rust and corrosion, W. M. Phillips, research laboratories division, General Motors Corp., Detroit, states: "On painted and enamel parts rustproofing treatments have been of great benefit, sometimes improving durability as much as 200 per cent."

He also notes "the great improvement in lacquers and enamels, including both nitrocellulose and artificial resin types. Better processes and better equipment have tended to reduce time required to bring about desired results. Bright nickel in the plating field and the use of artificial resin types of materials in painting are examples of this progress.

"Abrasive operations, such as polishing and buffing, are the most expensive parts of the operation generally referred to as finishing," says Mr. Phillips. "A better knowledge of proper abrasives and better finishes on sheet metals and on castings has been a great help in reducing expense. Use of full automatic and semiautomatic equipment for polishing has produced better work at lower cost.

"I believe that in the painting and plating operations there are more technically trained men than in most other departments. The plating operation is one which involves a knowledge of chemistry and of mechanical and electrical engineering, and for this reason men of this type are increasingly useful. In the painting field the artificial resins are developments of the organic chemists, and this type of chemistry is extremely involved, due to the complexity of chemical structures. Due to achievements by men of this type, durability is steadily improving."

Also commenting on the fight against rust and corrosion, Dr. Colin G. Fink, head of the division of electrochemistry, Columbia university, New York, says: "Not only have decided improvements been made in old processes of protecting steel against corrosion, but entirely new methods have been introduced." He points to the use in 1937 of the Tainton process of electrogalvanizing steel wire, and the increased use of nickel-clad steel, copper-clad wire and cadmium-zinc plated steel.

Dr. Fink believes there has been a marked tendency to eliminate polishing or buffing of plated steel articles. "This means a good deal in maintaining a low cost and insuring a more uniform product. Bright chromium, bright nickel, bright zinc, bright copper and other plated steels are now being commercially produced without any 'coloring.' In some cases there has been a mild heat treatment after the plating, in order to insure a perfect bond between the steel and the electrodeposit.

"In the new year we look forward to more intensive development in the heat treatment of electroplated steel parts. It has been found that heat treatment can be carried out at temperatures which will not materially affect the mechanical properties of the steel, provided that the atmosphere of the heat treating furnace is properly controlled. With the general adoption of strip steel, this will mean a tendency toward completely finishing the steel, applying various electroplates, before stamping or drawing or otherwise fabricating into the final shapes. The saving in handling is self-evident and steel will thus enter new fields of application."

"If the electroplating industry is to profit in 1938,

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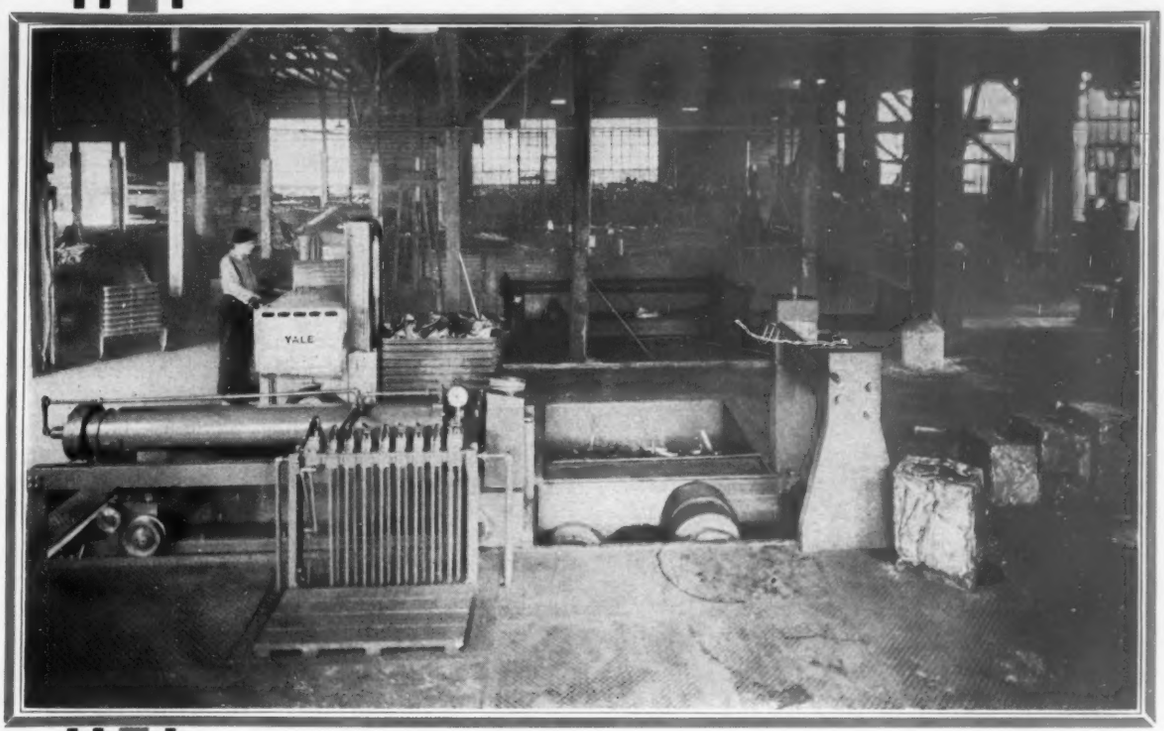

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Finishing operations assume greater importance yearly because of the trend toward more variety and better quality in finishes on retail merchandise

scientific control of all solutions and electrodeposits is essential," says Dr. C. B. F. Young, department of chemical engineering, Columbia university, New York. "Year by year the science of electrodeposition of metals becomes a field of endeavor for trained men and not a field of exploitation by the unlearned.

"For the electroplater, the year 1937 was marked by methods introduced for producing smooth, thick, bright deposits without buffing," he adds. Nickel-cobalt alloy plating has gained in popularity because of its attractive appearance, its resistance to corrosion and the fact that it does not tinge when stored.

"Zinc continues to find new applications as bright zinc. It is being substituted for cadmium with splendid results. Research has shown that zinc can be deposited as a blue white coating which is very attractive. However, because of its position in the electromotive series the deposits have a tendency to fingermark more easily than cadmium."

Numerous authorities direct attention to a galvanized sheet that can be painted immediately without acid etching or weathering and to which paint will stick. Such a product, says H. V. Mercer, American Rolling Mill Co., Middletown, O., is that company's Paintgrip sheet, a galvanized product with a crystalline phosphate coating which keeps the paint from direct contact with the zinc surface. Zincgrip is another type of galvanized sheet perfected during 1937 by the company. It has a heavy coating of commercially pure zinc that will not crack or peel when subjected to severe drawing or forming operations. From 16 to 28-gage, this is available in any of the basic grades of galvanized iron and steel sheets and strip manufactured by the company.

E. A. Anderson and H. A. Nelson, New Jersey Zinc Co., Palmerton, Pa., point to the more widespread use of bright nickel plating solutions. It is their joint belief that "the development of synthetic organic finishes has continued at a steady rate. Many of these finishes are finding application in connection with the finishing of zinc alloy die castings. A number of new coatings of the cellulose nitrate and cellulose acetate type have received greater attention during the year. Chemical pretreating prior to organic finishing of zinc has received greater attention and it is now quite generally accepted that pretreatment with phosphate type solutions is desirable, at least where maximum adhesion is an important factor. The use of priming paints based on metallic zinc powder on untreated galvanized structures is expanding as the result of continued satisfactory experience in service."

F. P. Romanoff, technical director, Apollo Metal Works, Chicago, is of the opinion that, while considerable development has been done in all fields of electroplating, no spectacular new practical processes have been seen. "The drive," he indicates, "has been to reduce costs and eliminate much tedious hand labor. In this respect the use of bright nickel in plating departments has increased and greater use made of prefinished sheet and strip metals in the fabricating departments. Prefinished metals have increased in use because of the new novelty finishes and products, such as crimped designs on strip metal, striping and patterns."

New Prefinished Metals Marketed

A development by this company is Protex, an easily-removable adhering paper which furnishes improved protection to metal surfaces. Adheso-Bak is also a new Apollo development; this adhesive-backed metal permits permanent application of prefinished metal to wood, glass or any substance without the use of heat.

J. B. Seastone, section engineer, feeder engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., calls attention to electroplating by the brush method, particularly the process developed by Nickel-Chromium Plating Corp., Chicago, for electroplating a wide variety of metals on objects too large for plating tanks. The plating operation consists of applying the electrolyte in a manner similar to brushing on paints. Being a portable device, it can be used outside of a plating room, and on restricted areas if so desired.

Mr. Seastone mentions the Flo-Bonderizing process developed by Parker Rust-Proof Co., Detroit, which consists of applying the Bonderite solution by brush; it also permits processing large structures which formerly could not be treated. He also mentions the Synhibit system of finishing outdoor structures by chemical treatment of steel surfaces before painting. Rust is removed and the surface of the steel changed as in well-known chemical rust-proofing methods. Polymerin baking finishes, products of Ault & Wiborg Corp., are considered notable by Mr. Seastone. This new type of synthetic resin baking enamel requires a bake of only 10 minutes at 300 degrees Fahr. to produce a hard, tough and adhesive finish.

In the field of prefinished metals, Carl C. Struever, general manager, American Nickeloid Co., Peru, Ill., points to three new American bonded metals. Tint-Metal, Scoring and Special Stripes. Tint-Metal is

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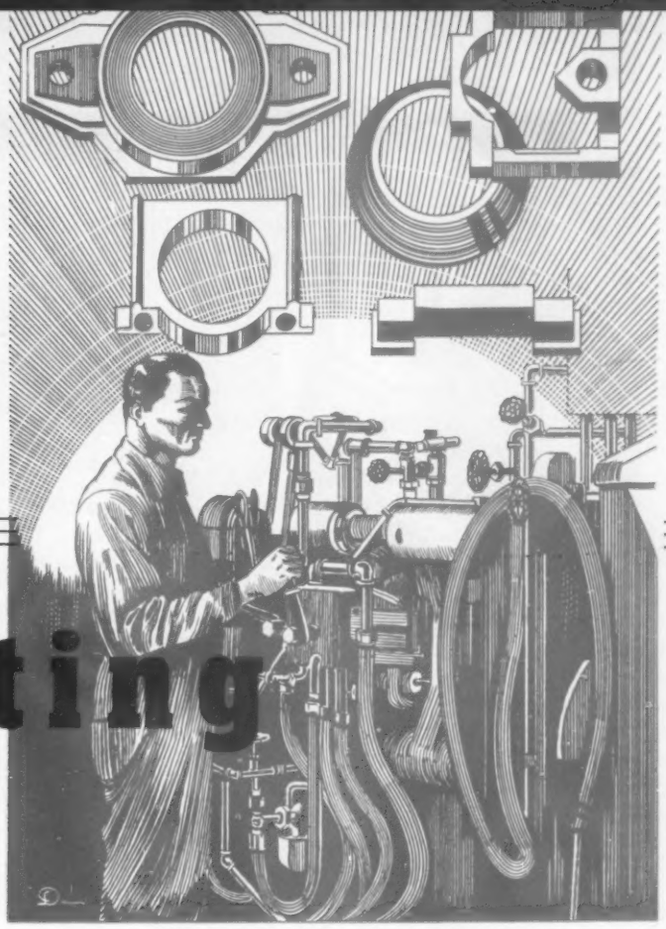

die casting

■ DIE CASTINGS again made notable progress in 1937 in finding new applications. Many machines now are built almost entirely of die cast parts; one interesting unit consists of no less than 71 die castings. The industry can expand even further, it is intimated, if die casting engineers will extend their studies to cover subsequent machining of parts.

Quality of die castings, says Marc Stern, AC Spark Plug division, General Motors Corp., Flint, Mich., has been improved in places where fluids are held under pressure and the castings must be leakproof. Costs have been reduced by reducing wall sections and by intelligent redistribution of the remaining metal to produce a casting at least as strong as originally.

"Die castings in 1937 have been applied in invisible places where no one would suspect their presence," says Mr. Stern. "In the steering column base, for example, packed in grease, is a zinc die casting, semicircular in form with an eccentric bushing at each end. The bushings carry the ball bearings for the worm which, when worn, can be quickly adjusted to proper clearance with the worm wheel. Another zinc die casting may be found in the hub around which the pointer stamping of a speedometer is crimped. The die casting acts as a counterweight and also carries a tapered hole 0.005-inch in diameter at the small end which presses onto the spindle of the speedometer.

"Another phase in die casting practice will require more intensive attention if the industry is to keep its competitive position with plastics, stampings or sand castings. This applies particularly to large volume production. Usual practice of the die casting engineer is to work with the prospect until a design which functions properly and is practical has been worked out. In other words, all holes, threads and the like that can conveniently be die cast within the required tolerance will be so planned and stock will be allowed on dimensions requiring sizing.

"This service is not sufficient for a product that may run, say, 5000 to 10,000 pieces per day. One must know in such instances how the die casting will be machined. If it is placed in a high production machine for sizing certain dimensions it may be possible to add drilling or tapping heads which will perform their operations quicker in the solid die casting than it costs to remove the flash from the cast holes or threads. It saves extra handling. It saves die costs and maintenance on the die casting equipment."

The die casting process made substantial progress during 1937, says Charles Pack, vice president, Doehler Die Casting Co., New York. Magnesium definitely has been established as a basic die casting metal.

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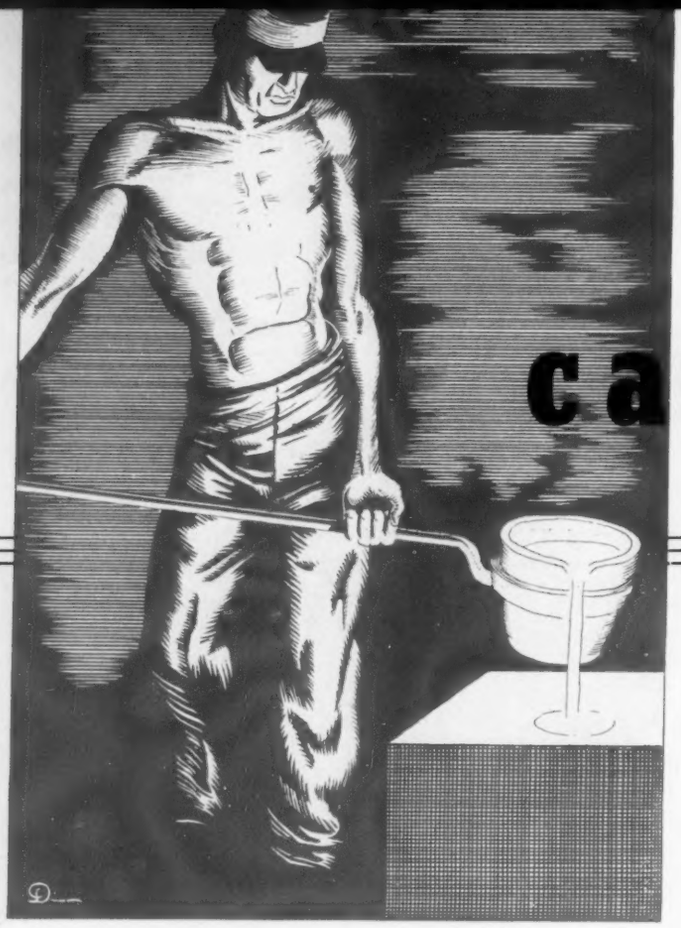
Pouring ingots of aluminum alloy for die castings. At right is a section of the large pot used for alloying



casting

■ IMPROVEMENT in physical properties, better appearance and more advanced heat treatments were the significant trends in castings during 1937. Foundries are maintaining closer control over mold materials and melting practice to improve quality of their product. Much interest attaches to the use of cement-sand molds, and newer processes for cleaning castings are being put into use. Increased mechanization, with installation of conveyors and more rapid production equipment, is observed as foundries seek to lower costs.

The steel casting industry faced an unprecedented situation in 1937, states F. A. Lorenz Jr., vice president, American Steel Foundries, Chicago, and president, Steel Founders Society of America. In the first nine months, operations were high with a peak of 105 per cent of capacity in one month; average for the year was about 70 per cent. In the last three months, the trend was sharply downward. Increased operating costs, because of broad wage increases and sharp rises in commodity prices, mainly scrap, seriously affected budgets, many plants being unable to absorb the increases without sustaining losses on tonnage placed in late 1936 and early 1937.

Wages increased about 20 per cent and prime elements of production cost rose 25 per cent. Steel foundry labor is receiving over 60 per cent of the normal production cost dollar; for a decade the proportion was about 50 per cent, according to Mr. Lorenz. Several new steel foundries were established and several discontinued production of commercial castings. Little change took place in rated capacity of the industry. Employes increased from about 30,000 at the end of 1936 to a high of 40,000 in June.

Plans are afoot for co-operative research in connection with improvement of product, these to include an industry advertising and trade promotion program. With lower production anticipated for 1938, Mr. Lorenz expects greater emphasis will be placed on problems of plant efficiency. In the past year, much obsolete equipment was replaced to give lower production costs.

The foundry industry has stabilized its position and 1937 was noteworthy from many points of view, in the opinion of F. A. Melmoth, vice president, Detroit Steel Casting Co., Detroit. There is a tendency in the engineering field to place reliance upon castings for working conditions for which castings have not previously been considered. This will produce "castings-conscious" engineers, he says.

More advanced forms of heat treatment have been applied to a larger percentage of steel castings; quenching and drawing, differential hardening, and similar treatments, becoming commonplace. Balanced alloy compositions and suitable heat treatments have provided remarkable physical properties in sand-cast unworked steel. Increased interest has been noted by Mr. Melmoth in impact values, both at normal and subnormal temperatures. This will quicken investigation and standardization work on impact values, their controlling factors and methods of determination.

In the writer's opinion, the steel foundry industry now needs to give concentrated attention to mold materials and their standardization. Metallurgically, steel castings are way ahead, and with effort directed to improve appearance and thereby increase appeal, together with greater promotion among engineers of improvement in product, the future of steel castings is bright. Concluding, Mr. Melmoth states competition from fabricated construction is real and not under-

estimated, but as one avenue closes, energetic self-help opens up others and a final balance is maintained.

Development of the process of molding in cement-sand mixtures is regarded by John Howe Hall, consulting engineer on steel foundry practice, Germantown, Philadelphia, as the most interesting development of the past year. From his experience in the past two years, he feels this to be the outstanding development of a decade.

Next to this, he places continued progress in development of stainless and heat-resisting castings. Sales of the three leading grades of castings of stainless and heat-resisting steel has been at a rate which reflects credit on the producing foundries.

Perhaps fully as interesting is the manufacture of cast magnet metals of the two grades aluminum-nickel and aluminum-nickel-cobalt, asserts Mr. Hall. Problems which had to be met in making the steel to attain uniformity of magnetic properties were numerous, as were foundry problems in obtaining sound and smooth pieces of accurate dimensions. Grinding this brittle metal to size also presented several tough problems, so that performance of makers of this new product in solving their problems has been most satisfactory.

Ferroalloys Are Employed More Widely

One of the interesting developments in the steel foundry, as viewed by W. J. Priestley, vice president, Electro Metallurgical Co., New York, is greater use of calcium-silicon, calcium-manganese-silicon and calcium-aluminum-silicon alloys as effective deoxidizers and cleansers. There has been a steady increase in use of nitrogen for refining grain of high-chrome alloy castings. Titanium alloys are used with success for high nickel magnet steels.

Use of vanadium is gaining, largely because of demand of railroads for steel castings of higher strength. A medium manganese steel containing about 1.50 per cent manganese and 0.10 per cent vanadium is proving satisfactory in numerous applications. Mr. Priestley reports a large increase in tonnage of steel castings containing approximately 3 per cent chromium which must possess both wear and shock resistance. Addition of 1 to 3 per cent chromium to Hadfield manganese steel to increase wear resistance is gaining favor.

Present indications are that in the near future special ferroalloys will be developed which can be used more efficiently in special applications. One of these, now being tried semicommercially, acts both as a deoxidizer and to control grain size.

In the cast iron foundry, Mr. Priestley reports use of a specially-prepared ferrosilicon compound as a ladle graphitizer is proving effective for eliminating chilled edges and corners of castings which must be machined. Use of medium carbon ferromanganese as a ladle addition to reduce shrinkage is an interesting new development. The past year has witnessed greater use of briquetted alloys, particularly ferrosilicon. Although known metallurgically for some time, foundries are just realizing that ferroalloys, particularly silicon, when added to cast iron in the ladle are more effective than when introduced with pig iron or scrap in the charge. Several new alloys for ladle additions were developed during the past year, but these are not yet marketed on a regular basis. Continuing, Mr. Priestley states foundrymen are more appreciative of advantages of chromium in castings for high-temperature applications. Relative small amounts of the element are more effective in preventing growth, while larger amounts not only prevent growth but impart to the iron a great increase in resistance to oxidation at high temperatures. So-called chrome iron containing about 28 per cent chromium and 2.50 per cent carbon is finding wider use for applications requiring high abrasion resistance.

Boron has been tried with some success as a hardener for cast iron used for wear resistance and there is steady increase in use of vanadium for improving grain structure and adding strength. Recent tests, says Mr. Priestley, show that addition of vanadium to chrome cast iron improves resistance to thermal shock.

Speaking officially as president of the Gray Iron Founders' society, P. E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, O., views 1937 as a year of paradoxes, but withall a year of progress. The year started with industrial activity not all of which was basically sound and healthy due to inflationary influences, too rapid wage rate advances and labor unrest. Continuing hostility of government toward business and failure of inflation to hold after business had piled up extensive inventories at high prices caused the recent sharp decline.

During early 1937 when tonnages were heavy and deliveries delayed, the foundry industry was faced with a shortage of skilled and semiskilled labor. Production schedules for quality products were maintained with difficulty. Intensive attention was given to apprentice training, only to have the year-end

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Problems in alloy steel castings occupied the minds of progressive foundrymen, several notable contributions to this field being made in technical papers through the year

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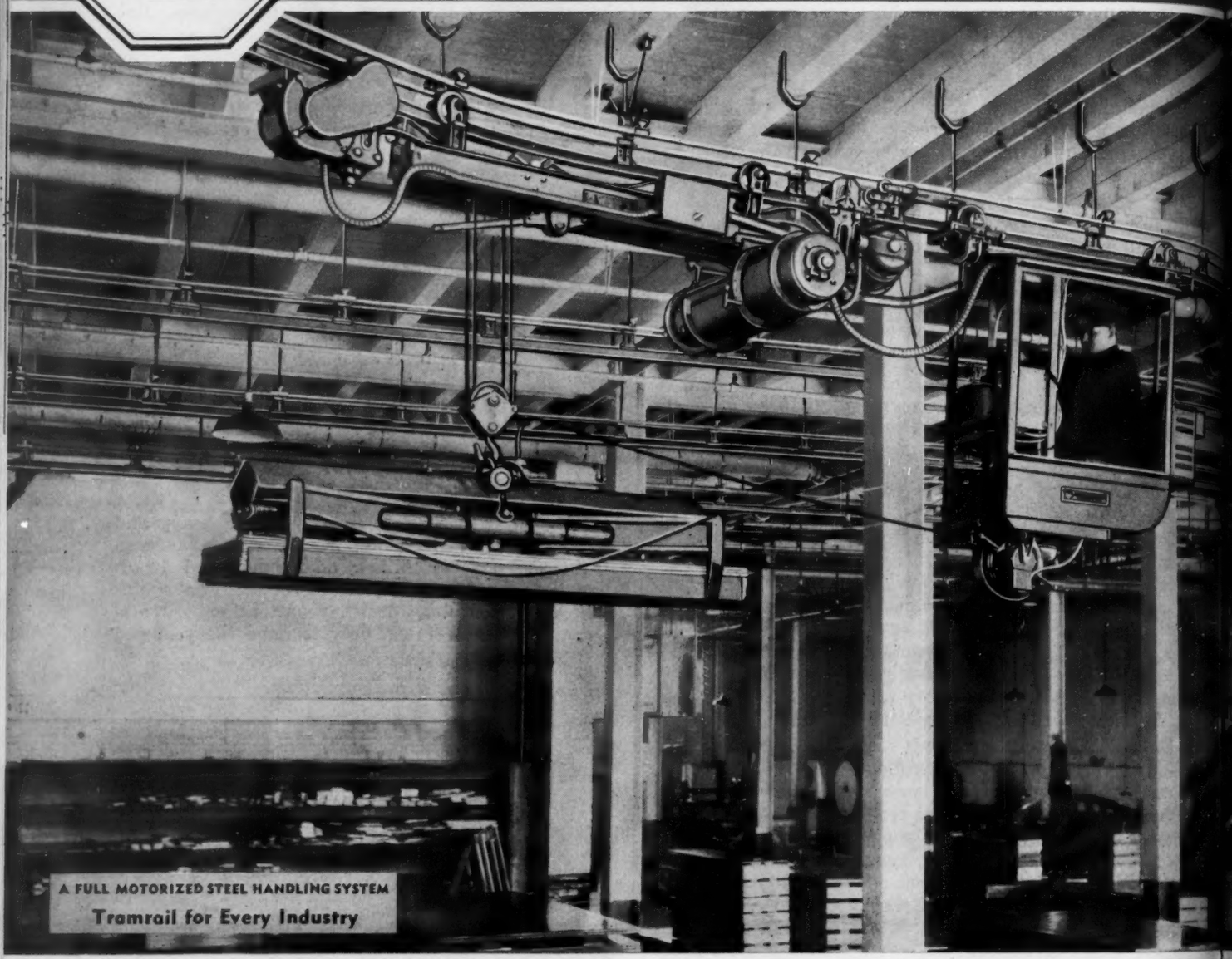

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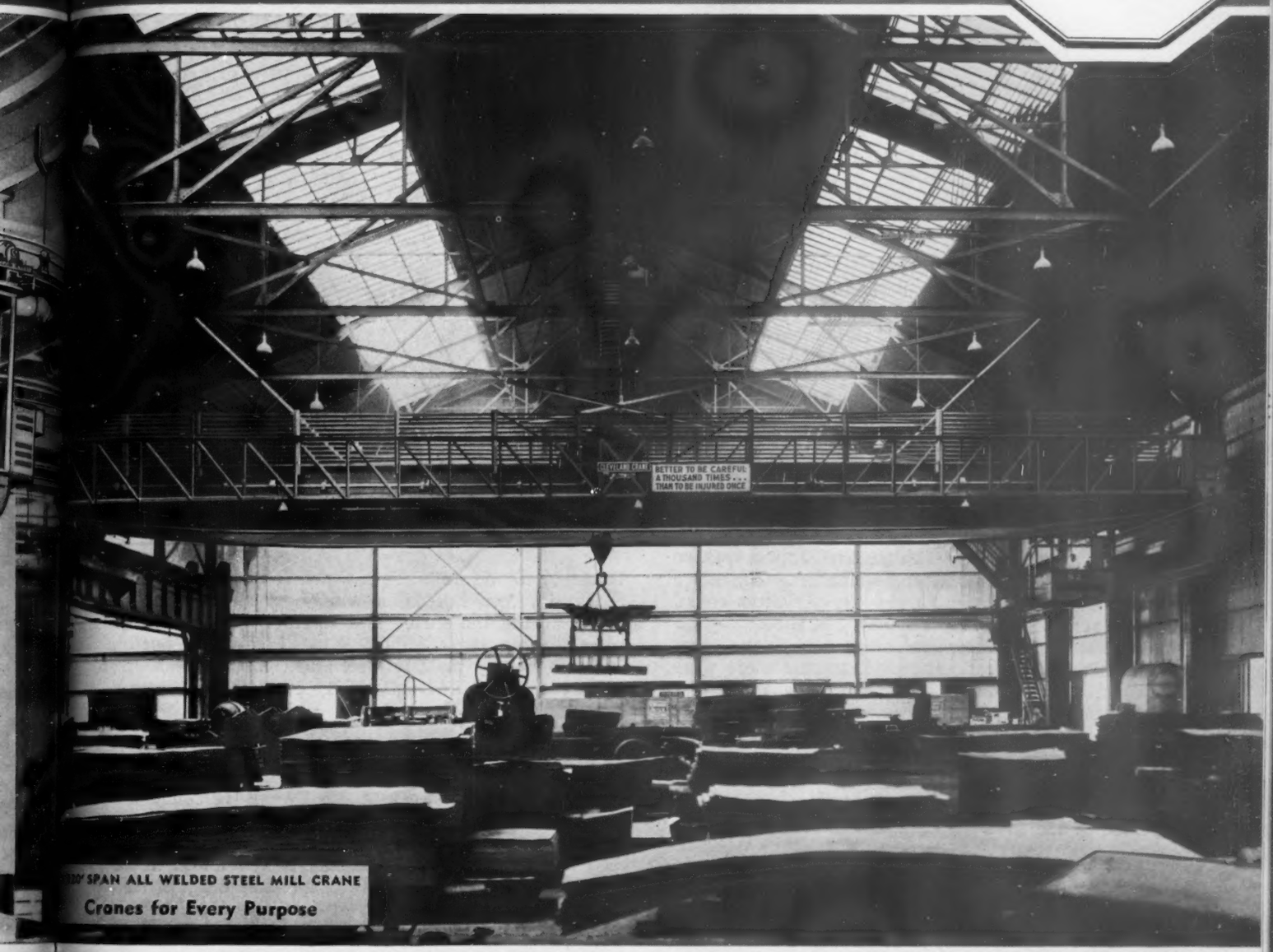

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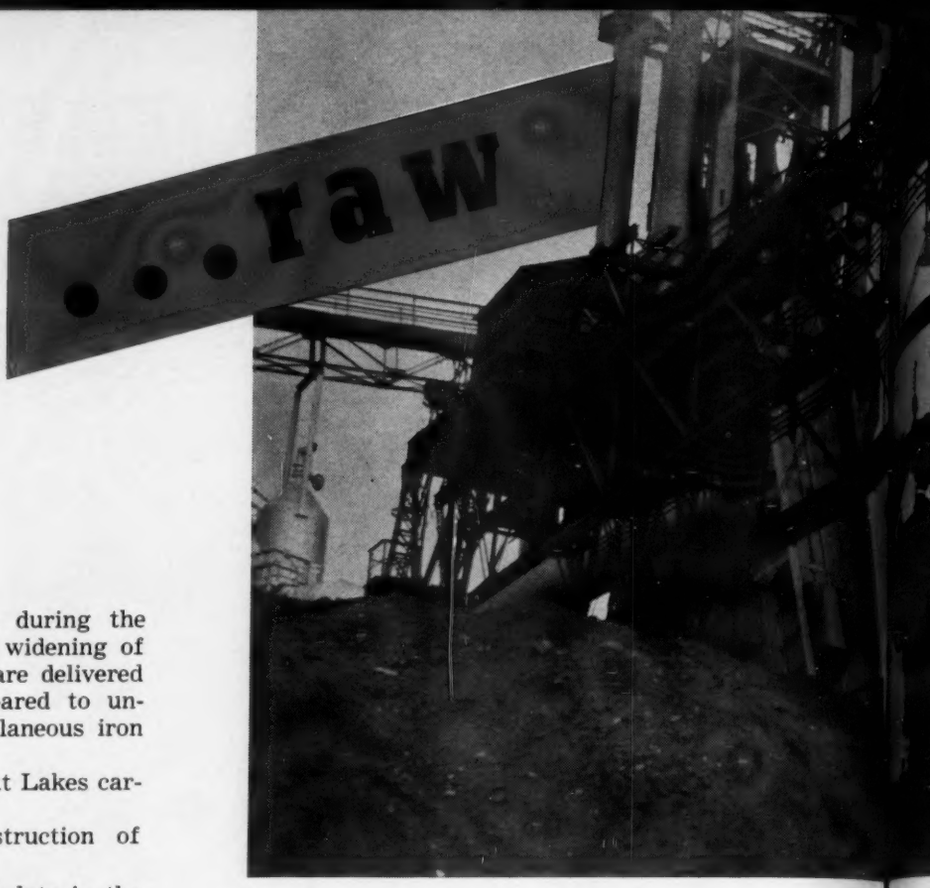


■ WORLD hunger for raw materials during the early months of 1937 brought about a widening of the channels by which these materials are delivered to the market place. Scrap prices soared to unprecedented heights, bringing out miscellaneous iron and steel from obscure corners.

Iron ore carriers moved down the Great Lakes carrying record cargoes.

Demand for coke necessitated construction of more than 450 by-product ovens.

Although this demand tapered sharply late in the year as result of curtailed steel production, the year's totals of raw materials consumed are impressive.

Demand for scrap by Europe and Japan was so great as to cause several complications. Extensive stocks piled up, especially on the Atlantic coast, pending arrival of bottoms to carry it abroad. Railroads at one time embargoed shipments to the coast to prevent further congestion. Domestic users were alarmed at the rate of exports and demanded restrictive measures.

In the first ten months, iron and steel scrap exports were 3,466,055 tons, largest volume in history, and greater than the total of finished steel exports. This was more than double the 1,704,723 tons of scrap exported in the first ten months of 1936.

European Consumers Form Buying Cartel

To avert competition among themselves, ten European consumers formed a buying cartel, the Federation of Raw Materials, with headquarters in London. Total purchases by the cartel in 1937 are estimated at 700,000 tons. In November the cartel bought 400,000 tons, the largest order for export scrap ever recorded. None of this material was shipped last year, there remaining a sizable volume against previous orders.

Consumption of iron and steel scrap last year by the steel industry in the United States, based on the estimated production of 50,367,000 tons of steel ingots, was approximately 39,600,000 gross tons, a gain of about 9 per cent over the 36,358,133 tons used in 1936. Of this a little more than 20,000,000 tons was home scrap, that produced in the plant of the consumer, and about 19,000,000 tons was purchased. In 1936, 18,901,389 tons of home scrap and 17,456,744 tons of purchased scrap was used.

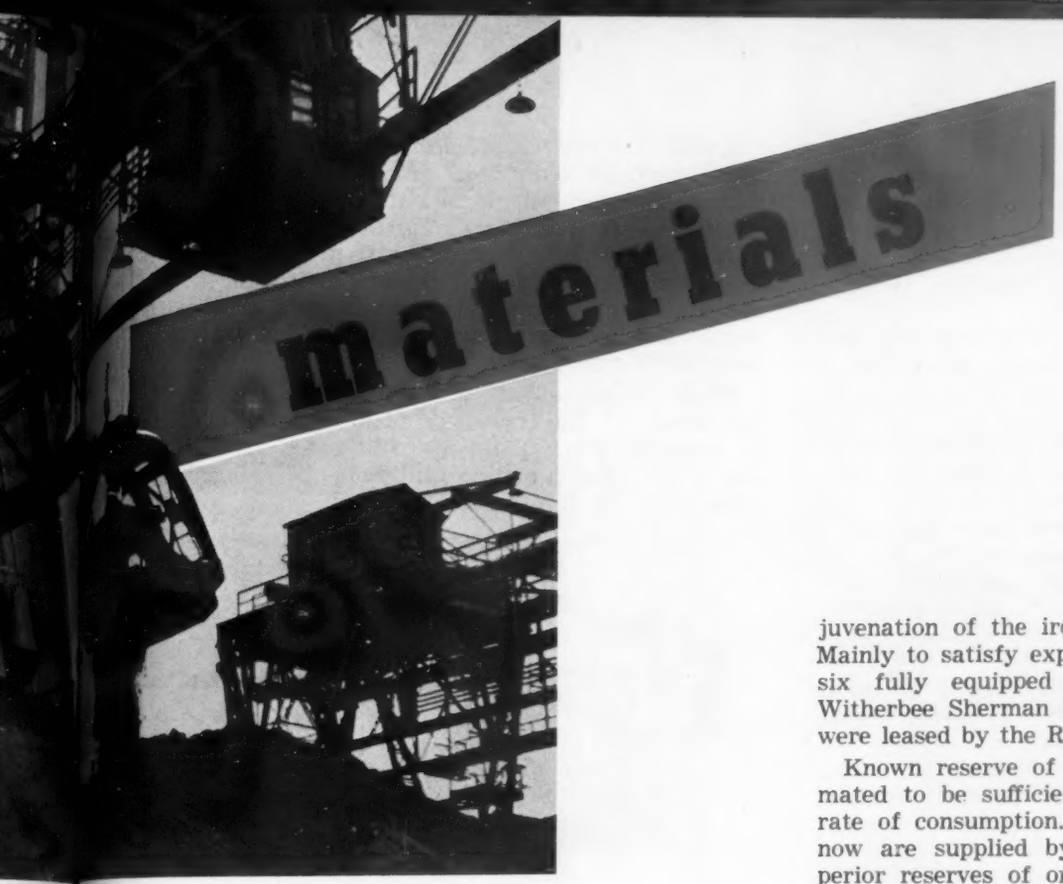
Handling of purchased scrap became a more perplexing problem in 1937 due to a substantial increase in the amount of alloy steel scrap. Often this necessitates separation of the alloy scrap and classification according to analyses. In many cases it is returned to the mills from which it originally came.

Scrap prices fluctuated widely, soaring to record highs during the spring and summer and then dropping sharply at year-end. STEEL's scrap composite, including heavy melting steel and compressed sheets, averaged $21.27 in April, declined gradually through June, $17.15, rose to $20.41 in August, then dropped to about $13 in December. Decline during the latter part of the year was caused by withdrawal of steelmakers from the market. Highest point was reached in the first week of April when the composite stood at $22.08.

High prices caused a revival of collection of scrap in places where formerly it had been allowed to accumulate and rust. Thus was illustrated again that a sufficient supply of scrap always is available—at a price. Amount used by steelmakers depends to an extent upon the price, the spread between what they must pay for scrap and the cost of making pig iron. In 1936, latest annual figures available, scrap consumed was equivalent to 137 per cent of the iron content of all domestic, foreign and manganiferous ores used in the United States. Purchased scrap alone equaled 66 per cent of the iron content of the ores.

■ AN ANTICIPATED record movement of iron ore was checked late last season by curtailment in consumption, which also caused the accumulation of abnormally large stocks. Despite the tapering at season's end, 1937 lake shipments were the third largest on record, 62,598,836 long tons. This was exceeded only in 1929 with 65,204,600 tons and 1916 with 64,673,000 tons. Estimated all-rail ore shipments of 600,000 tons brought the aggregate to 63,200,000 tons, compared with 66,673,000 tons in 1916 and 66,157,359 tons in 1929.

The 1937 lake movement marks a 39.6 per cent increase over the 44,822,023 tons shipped in 1936.



Probable shipments in 1938 are held to depend largely on the turn of business conditions, especially in the iron and steel industry.

Approximately 40,000,000 tons of ore was on hand at docks and furnaces Dec. 1, fourth highest amount at that date in history, which indicates substantial reserves will remain when the shipping season opens next spring. Consumption of ore by blast furnaces fell to about 3,200,000 tons per month near the end of the year. This rate for the remainder of the winter would leave approximately 25,000,000 tons on hand on May 1, compared with 14,632,038 tons May 1, 1937.

Normal accumulation at the season's close is considered as between 30,000,000 and 35,000,000 tons. Record high for accumulation of stocks was reached in 1922 with 44,004,201 tons. On Dec. 1, 1936, stocks were 35,378,068, slightly over the average.

Large Production, Small Stocks, At Ranges

Stocks at the ranges at the close of the 1937 season were estimated at 3,000,000 to 3,500,000 tons, compared with 16,508,000 tons in 1932, and 5,173,000 tons in 1936. Estimated production at the ranges was 61,500,000 tons, second to 1929.

Prospects for a record season caused many idle mines to be reopened and the pressing into service of all available lake carriers. Pittsburgh Steamship Co., Cleveland, launched four modern new bulk carriers late in the year, bringing its fleet to 73 freighters and six barges. Ore carriers were heavily loaded and aided by a higher water level broke previous records for individual cargo movements. Interlake Steamship Co.'s freighter HARRY COULBY set a record with 15,529 gross tons, after the former record of 14,617 tons had been broken twice.

Beneficiation of low-grade ores, already widely practiced on the Mesabi range and to a lesser extent on the Cuyuna, was improved and resulted in rejuvenation of the iron ore industry in New Jersey. Mainly to satisfy export demand, four of the state's six fully equipped mines were active in 1937. Witherbee Sherman Corp.'s properties in New York were leased by the Republic Steel Corp. for 25 years.

Known reserve of high-grade Mesabi ores is estimated to be sufficient for 40 years at the present rate of consumption. Half of present requirements now are supplied by these ores. Other Lake Superior reserves of ore merchantable as mined, providing 30 per cent of total needs, are thought large enough to last only 20 years, leading to more research with a view to beneficiating inferior grades.

Advances in wage and transportation rates increased ore and pig iron production costs. Miners and lake vesselmen received wage advances approximating 20 per cent. Iron ore advanced 45 cents a ton, the first raise since 1929. Lake transportation costs increased 10 cents a ton and rail freight charges for hauling ore from Michigan mines to docks and from lower lake ports to interior furnaces were increased 6 cents a ton.

Minnesota's iron ore occupational and royalty taxes were increased from 6 to 10 per cent for 1937 and to 8 per cent for the future. This increase is estimated to raise the state's revenue $3,500,000 for 1937 and 1938.

■ SHORTAGE of by-product coke late in 1936 and in the first nine months of 1937 necessitated construction of 467 new by-product ovens last year. Under construction are 15 for American Rolling Mill Co., 61 for Ford Motor Co., 41 for Colorado Fuel & Iron Co., and 130 for Great Lakes Steel Corp.

Connellsville, Pa., was more active during the year as numerous beehive ovens, long inactive, were pressed into service. In the first nine months beehive coke output was 2,621,700 tons, compared with 1,012,300 in the comparable period of 1936. In all of 1932 only 651,000 tons were produced.

By-product coke production in the first nine months was 39,114,971 tons, against 32,083,100 tons in the similar 1936 period. New by-product ovens completed and those under construction are expected to supply sufficient coke except in case of extreme demand, when it is possible beehive ovens will be needed to fill the gap.

Consumption of coke for each ton of pig iron produced has declined slowly over the past few years. In 1936, 0.895 tons of coke was used for each ton of pig iron produced, compared with 0.907 tons in 1929.

■ EARLY reversal of governmental tendencies would be the means of releasing a tremendous quantity of new buying orders for iron and steelworks equipment that would excel the rehabilitation program of the last two years. This is the opinion of many closely associated with the industry. Will it come? Only time will tell.

Let the weathervane point in that direction and then watch pile drivers and concrete mixers move into plant enclosures or on to new sites set aside for expansion purposes. Let certain tax measures be modified or abolished and the sound of riveting hammers will arouse old Vulcan in many a steelmaking district in this country.

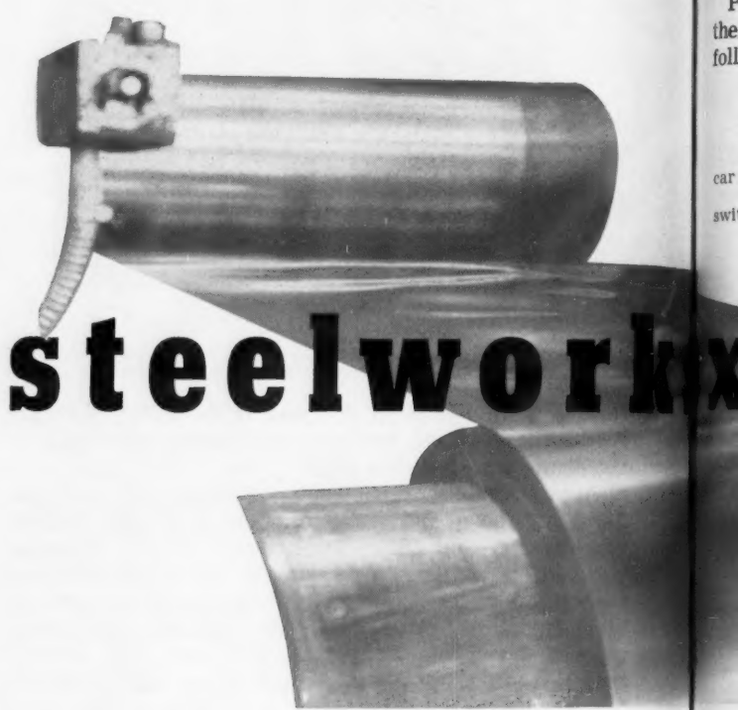
Take the plant isolated in the little mill town or the average plant tucked away in the hills of Pennsylvania or in the flats of any other steelmaking district. It makes little difference. Remodeling of the present setup or installation of new equipment must be undertaken.

Skip tracks at blast furnaces are taking on a coat of rust. The little stubby nose dinkey no longer is pushing as many drags of scrap up over the trestle and into the open-hearth building as it did. Fewer sparks pierce the blackness of the night at bessemer works. Idle rolls let you know that something has happened.

Right now in most any plant there should be heard the clang of steel coming from wrenches in the hands of millwrights as they overhaul and modernize equipment. Now is the time to put steelworking equipment in condition. Instead, the tools hang in their racks. Lights have been dimmed. Silence reigns.

Repairs are needed. Modernization programs have been forced on many steel producers. Considerable rolling equipment should be on its way to the open-hearth shop for remelting. But there the mill stands a few miles across the valley from a competitive plant which recently went modern and changed the appearance of cost sheets. There it stands with competition from up-to-date mechanization battering away at its gate.

What has happened? Just this—the delay whistle has sounded. The cry within plant enclosures is one of rehabilitation. Plant reconditioning stands out like a big question mark. But "hold-up" orders have come from the front office.



steelworks

With the taphole prepared, the runner in place and the ladle resting on its trunnions all is ready for the crew to "knock out" the heat from the open-hearth furnace. Here is the handiwork of a melter—a cauldronful ready for the molds

Throughout the steel industry right now there exists a close relationship between contemplated improvement and anticipated financing. Not many months ago several companies were anticipating the issuance of perhaps 150,000 maximum new shares of common stock to realize, say, something like $3,500,000.

Some of this fund was to have been used to reimburse the treasury for approximately $1,000,000 which was taken out of the working capital to pay for improvements currently made over the last two years. The remainder was to have been used for improvements for which appropriations had been approved in anticipation of the essential financing.

Inasmuch as many companies in this category have no fixed obligations prior to one class of common stock, they are not compelled to attempt the issuance of new shares under present conditions nor until conditions improve.

There are hundreds of such instances. In many cases new, satisfactory and early financing is urgently needed. In fact, it must be undertaken if the threat of ruined credit is to be avoided. And for such companies, an early reversal of present govern-

mental tendencies would seem imperative and can't come too soon. Meanwhile, the atmosphere is surcharged with talk of new construction.

Looking at the year just closed 17 steel producers, both integrated and nonintegrated, authorized the expenditure of $255,682,000 for needed improvements. About 67 per cent of this amount was sanctioned during the last half of 1937.

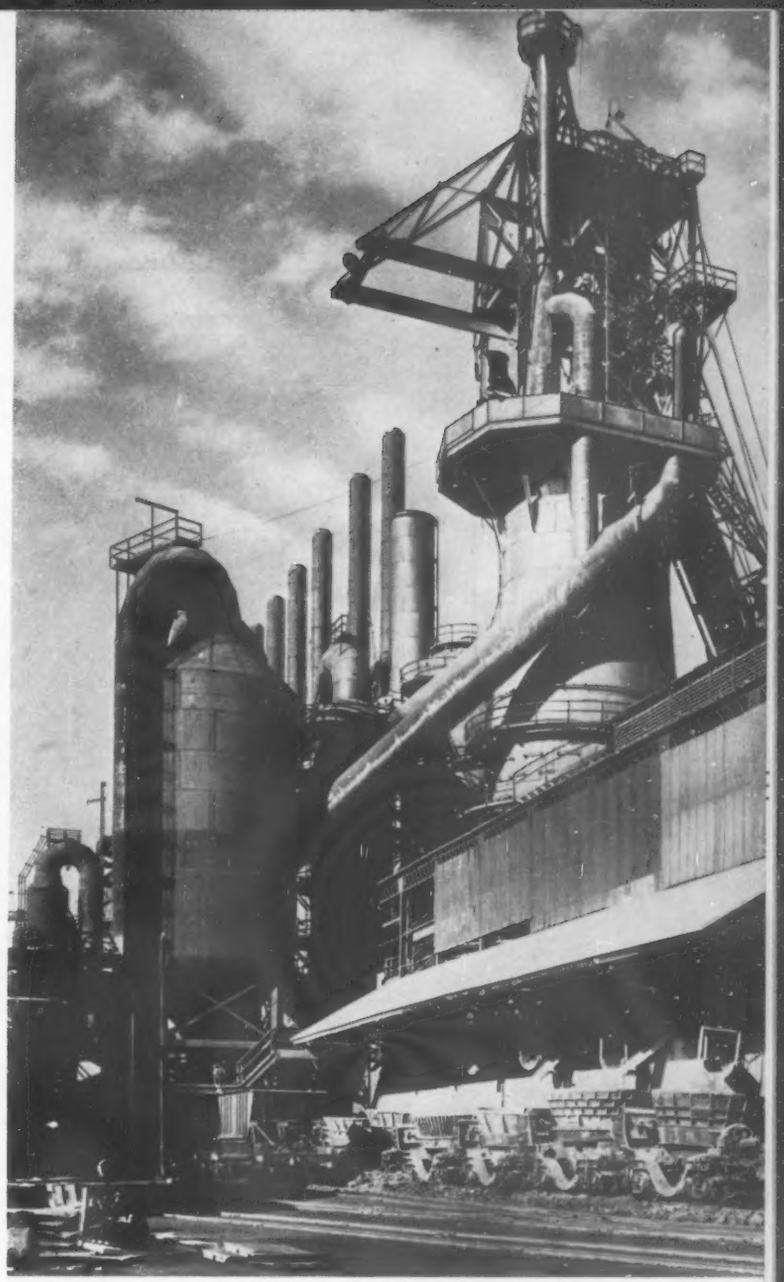
A large proportion of the total amount authorized is held in abeyance and probably will be kept under seal until some sort of cheer comes from the District of Columbia.

Soaking pit capacity, which a year ago loomed up as the bottleneck of the steel industry has been satisfied for the time being. More than 34 pits of various types were built or were under construction at the close of 1937.

Progress of construction completed in 1937 or in the process of completion as the new year opened follows:

kxpansion

BY JOHN D. KNOX
Associate Editor, STEEL



Construction of modern blast furnaces, long neglected in this country, is now in full sway again. Sighting the telescope on yesteryear brings 1928 into view, and, with it, the two most recent stacks to be built. But here is a 1938 model

CARNEGIE-ILLINOIS STEEL CORP.

Completed

Edgar Thomson Works: Modern car dumper and electric car pusher.

Duquesne Works: New switch house and modernizing switching equipment and wiring at electric power station.

Carrie Furnaces: Rebuilding, relining and improving blast furnace No. 6 and auxiliaries. Three hot blast stoves and improvements to auxiliary facilities at blast furnace No. 1 including relining.

Ohio Works: New boiler plant of four gas-fired boilers. Additions and improvement to blast furnace No. 1 and auxiliaries, including relining. Additional soaking pit furnace at 40-inch blooming mill.

South Works: Additions and improvements to No. 2 blast furnace and auxiliary facilities, including stack relining and two stoves. Improvement to furnace auxiliaries of blast furnace No. 5 including relining.

Gary Steel Works: Improvement to gas washers and relining blast furnace No. 9. Fourth bay addition, with four 10-ton cranes and extending the second and third bays of warehouse building at merchant mills. One hundred new ingot buggies for open-hearth department. Improvement to furnace auxiliaries of blast furnace No. 1, including relining.

Gary Tin Works: 5-stand tandem cold reduction mill with processing and finishing equipment.

Wood Works: 84-inch 3-high finishing mill with 2-high roughing stand. Rebuilding normalizing furnace.

Clairton By-Product Coke Works: Tar distillation still and naphthalene and tar acid recovering facilities.

Underway

Edgar Thomson Works: Improvement to blast furnace "T", including relining. Rebuilding and improving blast furnace "K" for production of ferromanganese.

Duquesne Works: Enlarging blast furnace No. 3 including relining. Three new hot blast stoves and relining and improving blast furnace No. 4.

Pittsburgh District: Construction of Irvin Works, including equipment for production of cold reduced sheet and tin plate products and hot rolled sheets, together with steelmaking, slab-rolling and electric power transmission facilities.

Ohio Works: Reconstructing gas washers and auxiliaries, vibrating screens, automatic weigh hoppers for coke screening and weighing, and relining blast furnace No. 2. Improvement and addition to stocking and charging facilities at open-hearth department. Relining and improving blast furnace No. 4 and auxiliaries.

Mingo Works: Relining and improving blast furnace No. 4 and one stove.

South Works: Three additional soaking pits and lengthening slab yard, including three additional cranes at 44-inch slabbing and blooming mill. Improvement to electrical switching equipment. Blast furnace blowing, electric power and steam generating facilities. Improvement to electric furnace plant. Electric power transmission line between South and Gary Steel Works, including transformer and switching facilities. Mold conditioning building and equipment at open-hearth department.

Gary Steel Works: Rebuilding by-product coke oven batteries Nos. 2 and 4. Relining and improving blast furnace No. 2 and auxiliaries. Relining and improving blast furnace No. 10. Additional vertical edging mill for 38-inch hot strip mill.

Clairton By-Product Coke Works: Benzol refining plant.

Gary Tin Works: 2-stand tandem temper mill, tandem mill converted from single-stand temper mill, and flying shear line.

Gary Sheet & Tin Works: Electrolytic cleaning lines in cold reduction department.

NATIONAL TUBE CO.

Completed

Lorain Works: Additions to blast furnace No. 2, including rebuilding the bin fronts, also relining the furnace. Six of the 12 furnaces at open-hearth department were rebuilt.

National Works: Two new soaking pit furnaces. Rebuilding blast furnace No. 3 and one stove, including relining.

(*Please turn to Page* 397)

Equipment Completed or Building in 1937

Open-Hearth Furnaces Completed

Company	Number of furnaces	Rated capacity, tons	Annual capacity, tons
Jones & Laughlin Steel Corp., Aliquippa, Pa.	1	135	85,000

Open-Hearth Furnaces Building

Company	Number of furnaces	Rated capacity, tons	Annual capacity, tons
American Rolling Mill Co., Kansas City, Mo.	1	100	70,000
Great Lakes Steel Corp., Ecorse, Mich.	4	150	342,800
Republic Steel Corp., Gadsden, Ala.	2	125	160,000
Total	7		572,800

Blast Furnaces Completed

Company	Number of furnaces	Daily capacity, tons	Annual capacity, tons
American Rolling Mill Co., Hamilton, O.	*1	450	147,250
Republic Steel Corp., Cleveland, O.	*1	1000	345,000
Total	2		492,250

*Replacement

Blast Furnaces Building

Company	Number of furnaces	Daily capacity, tons	Annual capacity, tons
Ford Motor Co., Dearborn, Mich.	1	1200	414,000
Great Lakes Steel Corp., Ecorse, Mich.	1	1000	345,000
Inland Steel Co., Indiana Harbor, Ind.	1	1000	345,000
Total	3		1,104,000

Blast Furnaces Remodeled

Company	Number or name
Carnegie-Illinois Steel Corp., Rankin, Pa.	No. 6
Columbia Steel Co., Provo, Utah	Ironton
National Tube Co., McKeesport, Pa.	No. 3
Republic Steel Corp., Buffalo, N. Y.	No. 2
Republic Steel Corp., Youngstown, O.	No. 3
Total	5

Bessemer Converters

Company	Number	Rated capacity, tons	Status, Dec. 31, 1937
Ford Motor Co., Dearborn, Mich.	1	25	Building
Northwestern Barb Wire Co., Sterling, Ill.	1	15	Building
Weirton Steel Co., Weirton, W. Va.	1	25	Completed

By-Product Coke Ovens Completed

Company	Number of ovens	Type of ovens	Est. annual coking cap., tons
du Pont de Nemours & Co. Inc., E. I., Charleston, W. Va.	25	*W	125,000
Ford Motor Co., Dearborn, Mich.	122	*K-B	770,000
Inland Steel Co., Indiana Harbor, Ind.	***59	*K-B	300,000
Tennessee Coal, Iron & Railroad Co., Fairfield, Ala.	**146	*K-B	742,400
Total	352		1,937,400

*Type of ovens: K-B, Koppers-Becker; W, Wilputte
**Replacement
***Rebuilt

By-Product Coke Ovens Building

Company	Number of ovens	Type of ovens	Est. annual coking cap., tons
American Rolling Mill Co., Hamilton, O.	15	*K-B	94,200
Carnegie-Illinois Steel Corp., Gary, Ind.	140	*W	1,030,000
Colorado Fuel & Iron Co., Denver, Colo.	41	*K-B	257,400
Ford Motor Co., Dearborn, Mich.	61	*K-B	385,000
Great Lakes Steel Corp., Ecorse, Mich.	130	*S-S	752,000
Total	387		2,518,600

*Type of ovens: K-B, Koppers-Becker; S-S, Semet-Solvay; W, Wilputte

Rolling Mills Completed

Company	No. mills	Type mills
American Steel & Wire Co., Joliet, Ill.	**2	rod
Barium Stainless Steel Corp., Canton, O.	1	20″ 4-high hot strip
Bethlehem Steel Co., Sparrows Point, Md.	1	56″ 4-high hot strip
Bethlehem Steel Co., Sparrows Point, Md.	1	56″ 4-high cold strip
Bethlehem Steel Co., Sparrows Point, Md.	1	rod mill
Carnegie-Illinois Steel Corp., Gary, Ind.	1	38″ edging
Carnegie-Illinois Steel Corp., Gary, Ind.	1	42″ tandem cold tin
Carnegie-Illinois Steel Corp., McKeesport, Pa.	1	84″ 3-high hot sheet
Cold Metal Process Co., Youngstown, O.	1	26″ 4-high cold strip
Cold Metal Process Co., Youngstown, O.	1	18″ 4-high cold strip
Cold Metal Process Co., Youngstown, O.	1	7½″ 4-high cold strip
Columbia Steel Co., Torrance, Calif.	1	60″ 3-high hot sheet
Detroit Steel Corp., Detroit	1	26″ 4-high cold strip
Detroit Steel Corp., Detroit	1	26″ 2-high cold strip
Empire Sheet & Tin Plate Co., Mansfield, O.	1	58″ 3-high hot sheet
Great Lakes Steel Corp., Ecorse, Mich.	1	93″ 4-high cold strip
Jones & Laughlin Steel Corp., Pittsburgh.	1	96″ 4-high hot strip
Jones & Laughlin Steel Corp., Pittsburgh.	1	84″ 4-high cold strip
Jones & Laughlin Steel Corp., Pittsburgh.	1	76″ tandem cold strip
Jones & Laughlin Steel Corp., Pittsburgh.	1	76″ 4-high cold strip
Jones & Laughlin Steel Corp., Pittsburgh.	1	54″ 2-high cold strip
Kilby Car & Foundry Co., Anniston, Ala.	1	18″ bar
Reeves Mfg. Co., Dover, O.	1	58″ 3-high hot sheet
Republic Steel Corp., Cleveland	*1	44″ blooming
Republic Steel Corp., Cleveland	1	98″ hot strip
Republic Steel Corp., Cleveland	1	76″ tandem cold strip
Republic Steel Corp., Cleveland	1	76″ 4-high cold strip
Republic Steel Corp., Cleveland	1	54″ 2-high cold strip
Republic Steel Corp., Niles, O.	1	42″ tandem cold tin
Republic Steel Corp., Warren, O.	†1	42″ 4-high hot strip
Republic Steel Corp., Warren, O.	1	4-high cold strip
Roebling's Sons Co., John A., Trenton, N. J.	1	3-high cold strip
Rustless Iron & Steel Corp., Baltimore	1	12″ 3-high merchant
Sharon Steel Corp., Sharon, Pa.	1	4-high cold strip
Tennessee Coal, Iron & R. R. Co., Fairfield, Ala.	2	56″ 3-high hot sheet
Thomas Steel Co., Warren, O.	1	24″ 4-high cold strip
Weirton Steel Co., Steubenville, O.	7	2-high cold tin
Wheeling Steel Corp., Beech Bottom, W. Va.	1	56″ 3-high hot sheet
Wheeling Steel Corp., Beech Bottom, W. Va.	1	48″ 3-high hot sheet
Wheeling Steel Corp., Steubenville, O.	1	3-high hot sheet
Wheeling Steel Corp., Yorkville, O.	1	4-high cold tin
Wisconsin Steel Co., S. Chicago, Ill.	1	40″ blooming
Wisconsin Steel Co., S. Chicago, Ill.	1	32″ blooming
Wisconsin Steel Co., S. Chicago, Ill.	1	21″ billet
Youngstown Sheet & Tube Co., Campbell, O.	1	54″ tandem cold strip
Youngstown Sheet & Tube Co., Campbell, O.	1	75″ 4-high cold strip
Youngstown Sheet & Tube Co., Campbell, O.	1	55″ 2-high cold strip
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.	2	42″ 4-high cold tin
Total	55	

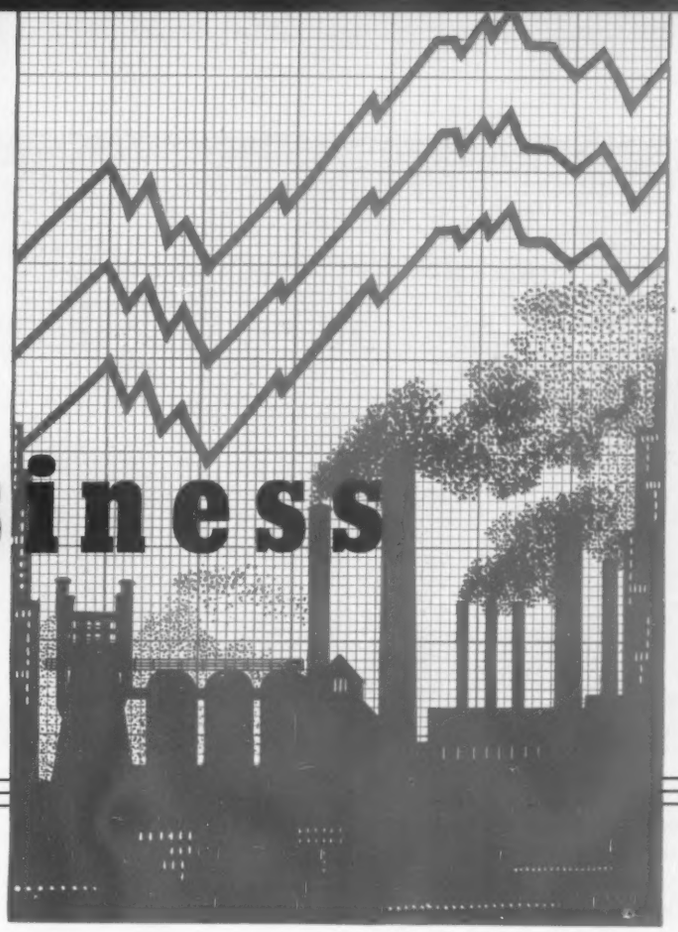
*Enlarged
**Replacement
†Single stand

Rolling Mills Building

Company	No. mills	Type mills
American Rolling Mills Co., Middletown, O.	*1	Blooming
Acme Steel Co., Riverdale, Ill.	1	29″ 4-high cold strip
Acme Steel Co., Riverdale, Ill.	1	29″ 2-high cold strip
Allegheny Steel Co., Brackenridge, Pa.	1	22″ 4-high cold strip
Carnegie-Illinois Steel Corp., Braddock, Pa.	1	48″ slabbing
Carnegie-Illinois Steel Corp., Irvin, Pa.	1	85″ hot strip
Carnegie-Illinois Steel Corp., Irvin, Pa.	3	84″ 4-high cold strip
Carnegie-Illinois Steel Corp., Irvin, Pa.	3	84″ 2-high cold strip
Carnegie-Illinois Steel Corp., Irvin, Pa.	1	84″ 4-high cold strip
Carnegie-Illinois Steel Corp., Irvin, Pa.	1	54″ 4-high cold strip
Carrel Steel Co., Chicago	1	14″ merchant
Carrel Steel Co., Chicago	1	10″ merchant
Cold Metal Process Co., Youngstown, O.	1	7½″ 4-high cold strip
Columbia Steel Co., Torrance, Calif.	1	24″ edging
Ford Motor, Dearborn, Mich.	1	60″ 4-high hot strip
Great Lakes Steel Corp., Ecorse, Mich.	1	blooming
Inland Steel Co., Indiana Harbor, Ind.	1	44″ 4-high hot strip
McLoud Steel Corp., Detroit	1	28″ 4-high cold strip
McLoud Steel Corp., Detroit	1	26″ 2-high cold strip
Northwestern Barb Wire Co., Sterling, Ill.	1	12″ 3-high merchant
Otis Steel Co., Cleveland	1	77″ 4-high cold strip
Otis Steel Co., Cleveland	†1	77″ 4-high hot strip
Spang-Chalfant & Co., Inc., Ambridge, Pa.	1	buttweld
Superior Steel Corp., Carnegie, Pa.	1	30″ 4-high cold strip
Superior Steel Corp., Carnegie, Pa.	1	30″ 2-high cold strip
Tennessee Coal, Iron & R. R. Co., Fairfield, Ala.	1	45″ blooming
Tennessee Coal, Iron & R. R. Co., Fairfield, Ala.	1	48″ 4-high hot strip
Tennessee Coal, Iron & R. R. Co., Fairfield, Ala.	2	4-high cold strip
Wallingford Steel Co., Wallingford, Conn.	1	16″ 2-high cold strip
Youngstown Sheet & Tube Co., Campbell, O.	2	tube piercing
Total	35	

*Remodeled
†Single stand

the business trend



■ Up to midyear, when signs of recession began to appear, 1937 entertained promise of establishing many new records in industrial activity. Inasmuch as the gains of the first half and the recession of the last half constitute an important part of the major economic cycle which started with the late depression, it seems appropriate, in presenting annual charts and statistics in this issue, to extend them to embrace the period from 1929 to date.

Consequently it will be found that the charts of the five weekly and 16 monthly barometers presented in the "Business Trend" section reflect trends throughout the entire cycle to the closing months of 1937. The relation of the recovery and recession phases of last year to the major recovery cycle is easily discernible.

In general, the highest peaks of 1937 fell short of attaining the heights recorded in 1929. For instance, STEEL'S index of activity in the iron, steel and metalworking industries touched a high point of 123.9 in the week ending May 1, 1937, as compared with 125.3 for the week ending April 27, 1929—the record for that year. The monthly index of industrial production compiled by the Federal Reserve board (adjusted for seasonal variation) stood at 118 in March, April and May—a high for 1937. This fell considerably short of the peak in 1929, which was 125, recorded in June.

However, a few indexes broke through 1929 ceilings during 1937. Weekly electric power output totaled 2,321,000,000 kilowatt-hours in the week ending Sept. 4, 1937, as compared with a high of only 1,860,000,000 in 1929. The three months moving average index of machine tool orders touched 234.2 in May, 1937, whereas the best record for 1929 was 183. Iron and steel exports in May, 1937, totaled 969,200 tons, which was more than three times the greatest tonnage shipped abroad in any month of 1929.

The record of industry for 1937 is noteworthy in that the remarkable production of the first half was achieved in the face of unusual handicaps. Floods interrupted industrial operations seriously on two occasions and in two widely separated districts. Strikes frequently disturbed the production of automobiles, curtailed steelworks operations severely in three important producing centers, and caused intermittent shutdowns of numerous plants throughout the metalworking

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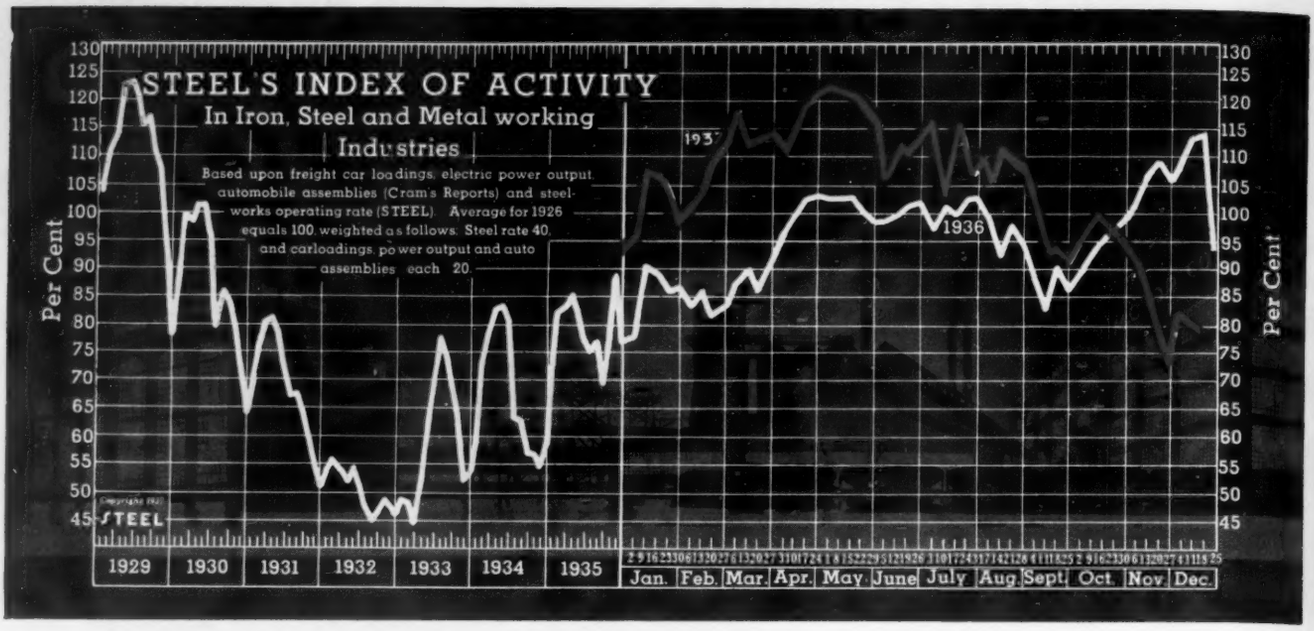

STEEL'S INDEX OF ACTIVITY
In Iron, Steel and Metal working Industries
Based upon freight car loadings, electric power output, automobile assemblies (Cram's Reports) and steelworks operating rate (STEEL). Average for 1926 equals 100, weighted as follows: Steel rate 40, and carloadings, power output and auto assemblies each 20.
Per Cent
1936
1929 1930 1931 1932 1933 1934 1935
Jan. Feb. Mar. Apr. May June July Aug Sept. Oct. Nov. Dec.

industries. Some of these disturbances are reflected clearly in the charts.

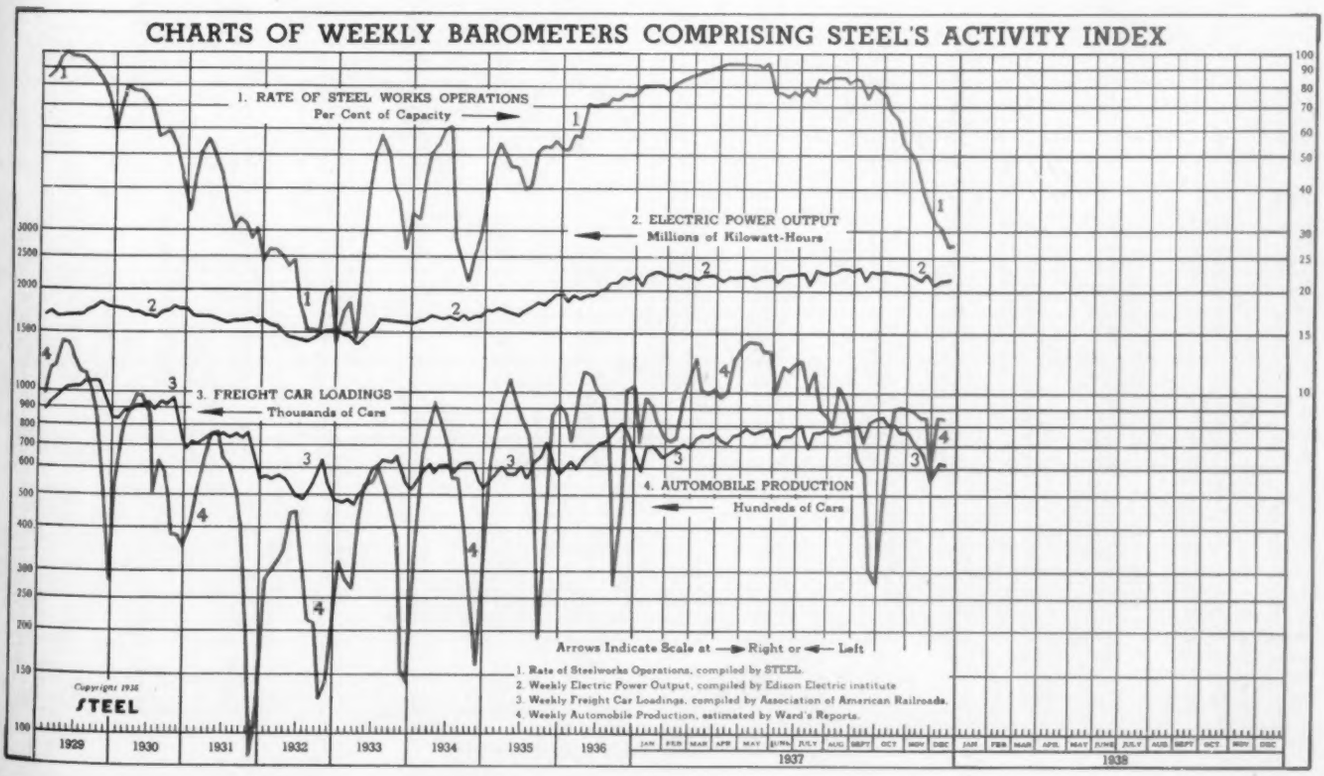
■ Another characteristic of 1937 was the sharp contrast between price and market conditions in the first half and those prevailing later in the year. Up to May, the trend of prices was upward and a sellers' market existed.

Demand eased during the early summer and by mid-September a buyers' market had developed. Prices declined steadily until late in December, when a reversal in the trend of prices of a few commodities indicated that the general price structure might be nearing a turning point.

	STEEL'S Index of Activity Index No.	Steelworks Operating Rate Per Cent	Weekly Automobile Output 1000 Units	Electric Power Output Million KWH	Freight Car Loadings 1000 Cars
1929					
Jan.	104.1	83	97.5	1,682	893
Feb.	111.2	85	116.2	1,718	942
Mar.	114.8	94	117.5	1,692	962
Apr.	122.5	98	139.7	1,692	996
May	122.9	96	138.5	1,699	1,051
June	118.6	95	123.2	1,686	1,052
July	115.2	95	112.7	1,689	1,038
Aug.	116.9	92	112.3	1,740	1,117
Sept.	110.8	85	97.7	1,763	1,135
Oct.	107.0	82	81.0	1,812	1,169
Nov.	92.2	74	50.1	1,789	978
Dec.	78.0	58	27.9	1,786	835
1930					
Jan.	87.6	67	55.1	1,789	837
Feb.	99.2	79	79.4	1,777	876
Mar.	98.6	76	85.5	1,735	883
Apr.	101.7	76	96.3	1,720	912
May	101.2	74	97.7	1,697	914
June	95.8	67	87.6	1,692	930
July	79.9	55	50.1	1,643	895
Aug.	85.4	57	63.2	1,685	938
Sept.	83.7	58	52.6	1,698	931
Oct.	78.8	53	37.7	1,728	950
Nov.	71.0	42	37.4	1,715	798
Dec.	64.2	33	34.6	1,720	680
1931					
Jan.	69.1	43	39.7	1,685	719
Feb.	75.5	51	51.4	1,669	709
Mar.	80.4	55	61.0	1,683	735
Apr.	81.0	50	73.9	1,660	752
May	78.6	44	75.7	1,636	740
June	72.0	36	63.8	1,614	748
July	68.3	30	60.5	1,626	738
Aug.	67.4	32	50.8	1,639	747
Sept.	64.2	31	41.0	1,635	737
Oct.	59.2	28	21.1	1,650	759
Nov.	54.4	30	8.5	1,627	655
Dec.	51.3	24	11.9	1,646	555
1932					
Jan.	54.6	26	27.8	1,586	567
Feb.	55.3	26	29.2	1,556	561
Mar.	54.2	25	31.5	1,527	565
Apr.	52.8	23	33.8	1,469	557
May	54.6	24	43.8	1,431	522
June	51.1	18	44.1	1,424	491
July	47.1	15	31.1	1.417	483
Aug.	44.9	15	21.1	1,425	525
Sept.	46.5	15	20.9	1,463	577
Oct.	48.4	19	12.6	1,515	634
Nov.	47.5	20	13.9	1,526	549
Dec.	46.2	14	23.5	1,512	485
1933					
Jan.	48.6	17	31.8	1,477	478
Feb.	48.2	18	28.0	1,456	489
Mar.	44.5	14	26.2	1,399	467
Apr.	52.4	22	42.5	1,414	503
May	63.5	38	53.1	1,470	527
June	70.3	49	54.3	1,544	598
July	77.1	56	59.8	1,631	617
Aug.	74.1	52	52.9	1,639	634
Sept.	68.0	41	45.9	1,634	634
Oct.	63.1	36	38.0	1,621	651
Nov.	52.7	26	15.3	1,606	572
Dec.	54.0	33	14.3	1,601	518
1934					
Jan.	58.7	32	32.4	1,611	548
Feb.	71.4	41	64.2	1,644	587
Mar.	79.1	49	78.3	1,656	614
Apr.	83.6	53	93.0	1,650	584
May	83.7	58	80.3	1,645	610
June	80.6	59	69.2	1,652	616
July	63.7	28	55.6	1,638	587
Aug.	62.7	24	55.6	1,659	613
Sept.	56.9	21	38.0	1,621	624
Oct.	56.4	25	24.3	1,665	629
Nov.	54.9	28	15.9	1,685	557
Dec.	58.9	36	25.2	1,726	526

	STEEL'S Index of Activity Index No.	Steelworks Operating Rate Per Cent	Weekly Automobile Output 1000 Units	Electric Power Output Million KWH	Freight Car Loadings 1000 Cars
1935					
Jan.	74.2	48	59.5	1,750	554
Feb.	81.9	53	79.2	1,754	583
Mar.	83.1	49	94.2	1,725	602
Apr.	85.0	45	109.6	1,700	576
May	81.8	45	96.7	1,699	578
June	77.4	39	84.8	1,728	617
July	75.3	40	77.3	1,763	565
Aug.	76.7	50	54.7	1,825	626
Sept.	69.7	52	19.0	1,822	658
Oct.	77.0	52	40.7	1,872	713
Nov.	88.1	54	87.4	1,916	625
Dec.	88.4	51	91.7	1,950	580
1936					
Jan.	85.9	51	86.8	1,820	595
Feb.	84.3	56	71.7	1,942	623
Mar.	88.7	55	92.2	1,880	605
Apr.	100.8	70	115.4	1,922	643
May	101.7	68	114.6	1,943	670
June	100.3	69	100.7	1,995	697
July	100.1	69	96.7	2,039	715
Aug.	97.1	72	72.4	2,103	738
Sept.	86.7	72	26.9	2,114	776
Oct.	94.8	74	47.5	2,170	819
Nov.	106.4	74	100.7	2,167	753
Dec.	107.6	75	104.9	2,219	673
1937					
Week ending:					
Jan. 2 ...	96.6	79.0	71.8	2,069	593
Jan. 9 ...	107.8	79.5	96.8	2,244	698
Jan. 16....	106.7	79.0	91.7	2,264	700
Jan. 23....	104.0	80.0	81.4	2,257	670
Jan. 30....	99.6	76.0	74.1	2,215	660
Feb. 6....	100.8	79.5	72.3	2,201	675
Feb. 13....	101.9	81.0	72.8	2,199	692
Feb. 20....	108.8	83.0	95.7	2,211	715
Feb. 27....	112.8	84.0	111.9	2,207	697
Mar. 6....	117.9	86.0	126.9	2,200	731
Mar. 13....	112.7	87.0	101.7	2,213	749
Mar. 20....	113.1	89.0	99.0	2,211	759
Mar. 27....	114.0	90.0	101.0	2,200	761
Apr. 3....	112.0	91.5	97.0	2,147	727
Apr. 10....	112.8	91.5	99.2	2,176	716
Apr. 17....	119.6	91.5	125.5	2,173	751
Apr. 24....	122.0	91.5	133.2	2,188	761
May 1....	123.9	91.0	139.5	2,194	782
May 8....	123.5	91.0	140.2	2,176	767
May 15....	123.2	89.0	140.4	2,195	774
May 22....	122.2	91.5	131.3	2,198	779
May 29....	115.6	75.0	131.4	2,207	795
June 5....	105.1	75.0	101.6	2,131	692
June 12....	111.4	74.0	118.8	2,214	754
June 19....	110.3	75.5	116.6	2,214	756
June 26....	112.8	74.0	121.0	2,238	774
July 3....	115.3	77.5	122.9	2,238	806
July 10....	103.8	74.0	100.9	2,096	682
July 17....	115.7	82.0	115.4	2,298	770
July 24....	108.0	81.0	88.1	2,259	771
July 31....	109.1	84.0	86.4	2,256	783
Aug. 7....	107.3	84.5	78.7	2,262	770
Aug. 14....	113.8	84.0	103.2	2,300	777
Aug. 21....	110.3	81.0	93.3	2,304	781
Aug. 28....	108.5	83.0	83.3	2,295	787
Sept. 4....	104.8	83.0	64.2	2,321	805
Sept. 11....	94 3	72.0	59.0	2,154	711
Sept. 18....	95.0	80.0	30.1	2,281	827
Sept. 25....	93.0	76.0	28.0	2,266	840
Oct. 2....	96.0	74.0	45.8	2,276	847
Oct. 9....	99.0	66.0	71.9	2,280	815
Oct. 16....	101.8	63.0	89.7	2,276	810
Oct. 23....	97.5	53.0	91.9	2,282	770
Oct. 30....	95.7	51.0	90.2	2,255	772
Nov. 6....	92.3	47.0	89.8	2,202	732
Nov. 13....	86.5	39.0	85.3	2,177	689
Nov. 20....	84.9	35.0	85.8	2,224	647
Nov. 27....	72.7	31.5	58.9	2,065	559
Dec. 4....	81.5	30.5	86.8	2,153	623
Dec. 11....	80.5	27.0	85.8	2,196	622
Dec. 18....	79.7	27.0	82.0	2,202	604
Dec. 25....	...	23.0	67.2	....	...

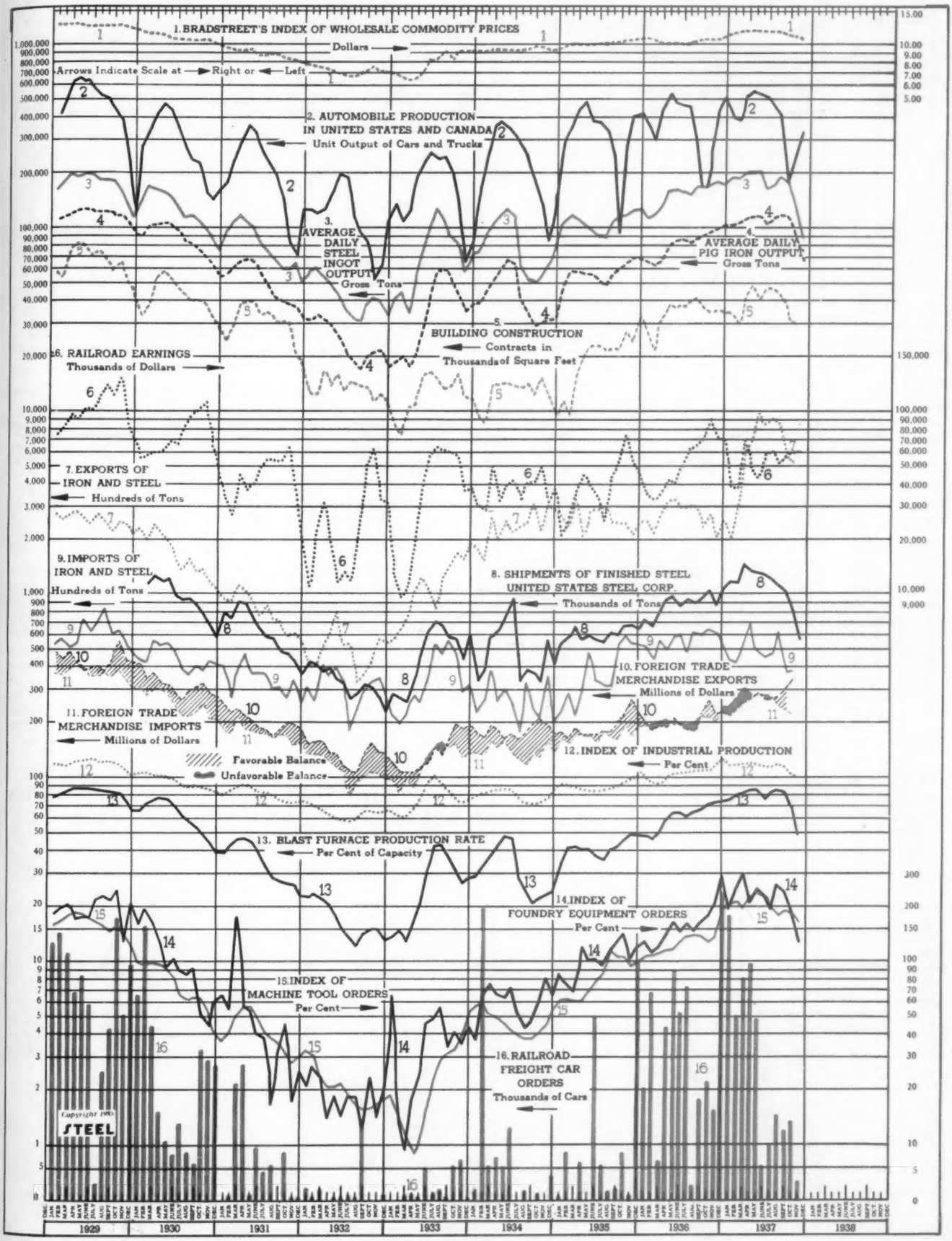
CHARTS OF WEEKLY BAROMETERS COMPRISING STEEL'S ACTIVITY INDEX



	Bradstreet,s Index Dollars	Auto Output 1000 Cars	Building Awards Million Sq. Ft.	Railroad Earnings Million Dollars	Exports of Iron and Steel 1000 Tons	Shipments Finished Steel U. S. S. 1000 Tons	Imports of Iron and Steel 1000 Tons	Foreign Trade Exports Million Dollars	Foreign Trade Imports Million Dollars	Index Industrial Production Per Cent	Blast Furnace Production Rate Per Cent	Index of Fdy. Equip. Orders Per Cent	Index of Machine Tool Orders Per Cent	R. R Freight Car Orders 1000 Cars
1929														
Jan.	12.97	422	58	76	274.3	....	54.7	488	369	119	79.0	180.5	158.4	12.45
Feb.	12.98	498	54	83	259.7	....	58.1	442	369	118	82.2	197.0	166.8	14.39
Mar.	13.00	626	78	96	270.9	....	52.7	490	384	118	85.5	209.4	177.9	11.07
Apr.	12.87	664	85	93	277.6	....	54.3	425	411	121	87.4	172.6	183.0	6.98
May.	12.68	636	81	101	261.5	....	74.3	385	400	122	89.8	177.7	182.7	8.36
June.	12.46	567	72	103	247.8	....	63.6	393	353	125	88.5	177.3	174.8	5.87
July.	12.49	518	75	122	270.5	....	71.4	403	353	124	87.2	219.3	163.5	0.24
Aug.	12.63	512	67	139	242.9	....	83.9	381	369	121	86.4	229.5	156.8	2.56
Sept.	12.67	430	60	132	222.4	....	60.9	437	351	121	83.3	216.3	147.4	4.26
Oct.	12.70	395	66	151	247.6	....	63.2	529	391	118	82.6	245.3	159.2	17.21
Nov.	12.40	227	51	85	241.8	....	54.0	442	339	110	75.8	128.6	137.1	5.13
Dec.	12.24	125	44	71	215.2	....	47.8	427	310	103	65.5	208.0	123.2	9.79
1930														
Jan.	11.68	284	33	55	225.1	1,104	43.6	411	311	106	65.0	160.1	97.3	6.63
Feb.	11.51	346	38	58	197.2	1,142	43.3	349	282	107	72.1	196.4	95.7	15.93
Mar.	11.22	417	54	60	238.3	1,240	56.6	370	301	103	74.5	164.1	98.6	4.46
Apr.	11.18	468	57	61	208.6	1,189	53.7	332	308	104	75.4	122.8	98.1	1.54
May.	10.94	445	54	68	196.1	1,204	54.3	320	285	102	74.2	92.7	91.6	1.08
June.	10.77	350	48	68	159.4	985	48.9	295	250	98	69.3	102.1	81.3	0.79
July.	10.56	276	45	81	131.8	947	39.1	267	221	93	60.3	90.6	65.1	1.31
Aug.	10.45	234	40	94	151.2	947	35.4	298	218	90	57.8	85.2	61.1	0.82
Sept.	10.43	229	41	103	131.2	867	40.2	312	226	90	53.8	91.0	63.0	0.57
Oct.	10.30	159	39	111	131.9	785	38.3	327	247	88	49.6	50.0	62.8	3.29
Nov.	10.06	142	33	61	112.0	676	43.1	289	204	86	44.1	45.3	53.0	2.86
Dec.	9.84	161	29	49	102.0	579	40.7	275	209	84	38.1	59.8	40.6	2.69
1931														
Jan.	9.51	178	25	34	92.7	800	40.7	250	183	83	38.4	65.3	36.3	0.00
Feb.	9.31	230	28	27	91.2	762	28.0	224	175	86	42.5	54.7	40.6	0.02
Mar.	9.17	289	38	46	109.3	907	40.4	236	210	87	45.4	174.4	49.6	2.17
Apr.	9.23	354	39	39	101.4	879	47.8	215	186	88	46.5	57.7	56.6	2.77
May.	8.91	330	39	41	95.0	764	37.1	204	180	87	44.7	54.1	57.3	0.05
June.	8.64	258	34	50	75.6	653	37.8	187	174	83	37.9	40.9	49.2	0.97
July.	8.78	223	34	56	84.5	594	37.2	181	175	82	32.7	38.7	41.1	0.44
Aug.	8.79	192	31	55	73.3	573	30.1	165	167	78	28.7	16.9	38.2	0.53
Sept.	8.49	143	30	54	69.8	487	30.9	180	170	76	27.0	31.9	35.0	0.00
Oct.	8.30	82	31	63	59.3	476	27.4	205	169	73	26.3	45.9	31.9	0.80
Nov.	8.09	70	21	36	59.6	436	34.6	194	150	73	15.5	17.2	28.0	0.03
Dec.	7.91	124	17	27	57.3	351	25.8	184	154	74	22.0	26.3	30.1	0.01
1932														
Jan.	7.73	123	13	11	40.7	426	31.0	150	136	72	22.1	20.5	32.8	0.16
Feb.	7.52	123	12	22	40.5	413	26.7	154	131	69	23.4	32.9	30.4	0.01
Mar.	7.32	127	17	33	49.9	389	41.0	155	131	67	22.0	27.9	23.9	0.11
Apr.	7.15	155	14	20	58.1	395	35.9	135	126	63	20.2	13.9	20.6	0.00
May.	6.92	192	16	12	80.5	338	39.7	132	112	60	17.9	18.5	20.8	0.03
June.	6.68	190	12	12	52.1	325	34.5	114	110	59	14.7	14.2	21.7	0.05
July.	6.73	117	14	11	52.6	272	18.0	107	79	58	13.0	18.7	18.7	0.03
Aug.	6.80	94	14	28	33.0	292	23.6	109	91	60	12.0	18.6	16.8	0.02
Sept.	7.17	86	14	49	36.0	316	29.2	132	98	66	14.0	11.9	15.3	1.29
Oct.	7.28	52	11	63	41.2	310	33.7	153	106	67	14.7	23.2	15.7	0.00
Nov.	6.97	62	12	33	56.0	276	34.9	139	105	65	14.7	13.8	16.4	0.00
Dec.	6.89	109	7	32	54.1	228	29.3	132	97	66	12.5	18.6	17.6	0.05
1933														
Jan.	6.79	132	8	14	56.7	285	21.8	121	96	65	13.3	68.4	18.3	0.00
Feb.	6.53	109	7	10	63.9	276	19.7	101	84	63	14.3	16.1	15.2	0.00
Mar.	6.35	122	10	10	80.6	257	22.1	108	95	59	12.7	9.8	11.1	0.01
Apr.	6.54	185	11	19	100.4	335	28.0	105	88	66	15.1	19.4	8.3	0.05
May.	6.98	224	15	41	123.1	455	26.2	114	107	78	20.9	25.6	10.6	0.01
June.	8.02	257	16	59	102.6	604	34.3	120	122	91	30.6	45.5	15.5	0.50
July.	8.34	236	15	64	88.3	701	52.8	144	143	100	42.2	48.8	22.4	0.07
Aug.	9.01	239	13	61	119.4	668	46.8	132	155	91	42.8	56.3	27.9	0.13
Sept.	8.99	198	13	61	108.8	575	55.7	160	147	84	36.4	34.9	30.9	0.02
Oct.	9.05	138	16	57	164.8	573	46.6	193	151	76	31.8	42.5	33.3	0.52
Nov.	8.85	63	12	38	157.6	430	28.9	184	129	72	26.2	36.6	38.0	0.67
Dec.	8.81	84	11	38	184.6	601	31.3	193	134	75	27.9	43.8	51.1	0.01
1934														
Jan.	8.83	163	10	31	178.0	332	22.6	172	136	78	28.8	37.2	56.5	0.15
Feb.	9.01	239	8	29	151.2	385	25.4	163	133	81	32.5	65.8	58.2	19.72
Mar.	9.26	353	15	52	261.3	588	38.4	191	158	84	37.5	75.4	50.9	0.52
Apr.	9.17	371	14	32	201.5	643	26.8	179	147	78	41.4	67.9	48.5	0.75
May.	9.16	351	15	39	241.8	745	29.4	160	155	86	47.5	66.5	46.8	0.52
June.	9.14	320	15	42	219.4	985	24.8	171	136	78	46.3	70.4	42.6	1.22
July.	9.24	276	13	35	233.2	370	17.6	162	127	75	28.4	50.7	38.6	0.00
Aug.	9.32	245	14	40	242.9	378	32.4	172	120	73	24.5	43.1	37.1	0.11
Sept.	8.48	176	13	41	301.3	370	23.8	191	132	71	21.5	46.4	37.4	0.00

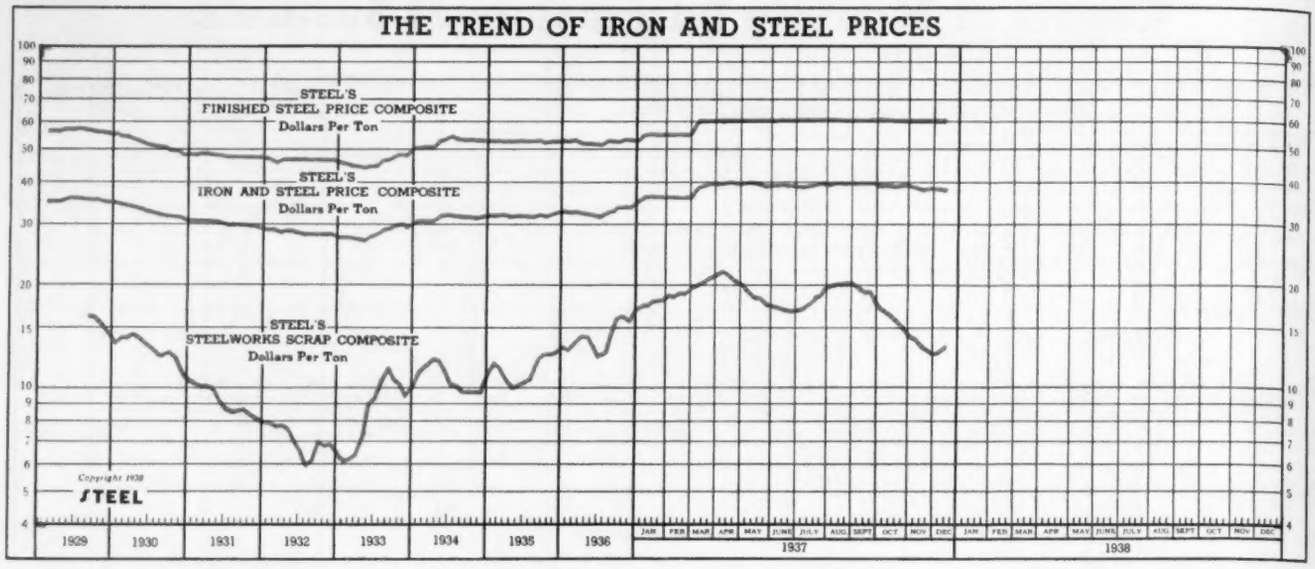
(*Concluded on Page 288*)

Charts of Monthly Barometers of Business



Key: 1. Bradstreets' Index (Average of Wholesale Commodity Prices. 2. Automobile Production in United States and Canada, compiled by U. S. Department of Commerce. 3. Average Daily Steel Ingot Output, compiled by American Iron and Steel Institute. 4. Average Daily Pig Iron Output, compiled by STEEL. 5. Building Construction, Contract Awards in 37 States, compiled by F. W. Dodge Corp. 6. Railroad Earnings, Net Operating Income for Class I Roads, compiled by Bureau of Railroad Eco-

(Continued at bottom of next page)



(*Concluded from Page 286*)

	Bradstreet's Index Dollars	Auto Output 1000 Cars	Building Awards Million Sq. Ft.	Railroad Earnings Million Dollars	Exports of Iron and Steel 1000 Tons	Shipments Finished Steel U. S. S. 1000 Tons	Imports of Iron and Steel 1000 Tons	Foreign Trade Exports Million Dollars	Foreign Trade Imports Million Dollars	Index Industrial Production Per Cent	Blast Furnace Production Rate Per Cent	Index of Fdy. Equip. Orders Per Cent	Index of Machine Tool Orders Per Cent	R. R. Freight Car Orders 1000 Cars
Oct.....	9.46	136	15	49	220.2	344	20.2	206	130	73	22.1	55.3	40.5	0.08
Nov.....	9.28	85	13	33	209.3	366	35.2	195	151	74	22.8	80.4	44.2	0.00
Dec.....	9.29	156	9	39	282.7	419	69.7	171	132	86	23.7	66.9	54.1	0.36
1935														
Jan.....	9.49	300	11	21	262.7	534	22.7	176	167	91	34.2	76.6	61.3	0.02
Feb.....	9.78	350	10	26	228.5	583	28.9	163	153	89	41.4	75.7	61.5	0.81
Mar.....	9.79	448	16	38	323.0	668	21.4	185	177	88	41.0	69.4	60.3	0.00
Apr.....	9.66	477	20	35	205.3	592	28.8	164	171	91	40.0	113.2	60.3	0.60
May.....	9.79	382	22	40	286.6	599	47.7	165	171	85	40.2	100.7	67.1	0.00
June.....	9.90	372	23	34	289.7	578	33.2	170	157	91	37.2	100.2	76.7	5.15
July.....	9.84	345	22	37	296.8	548	31.9	173	178	86	35.2	94.0	94.7	0.50
Aug.....	9.91	245	22	42	247.3	625	31.3	172	169	87	40.7	113.0	112.2	0.10
Sept.....	10.00	93	21	57	244.4	615	53.1	198	162	89	42.5	128.5	108.5	0.11
Oct.....	10.17	280	28	75	238.4	687	59.5	221	189	95	45.8	140.0	102.9	0.81
Nov.....	10.28	409	24	54	205.2	682	56.6	269	169	98	49.5	100.4	93.8	0.03
Dec.....	10.40	418	33	46	239.3	661	53.7	223	187	104	49.0	118.1	89.9	10.03
1936														
Jan.....	10.36	377	27	36	241.6	721	50.4	199	187	98	48.2	127.0	102.6	2.05
Feb.....	10.02	301	21	34	213.8	676	43.5	182	193	94	46.6	110.4	107.1	6.90
Mar.....	9.92	439	31	35	264.3	784	56.7	195	199	93	48.5	115.0	109.4	0.63
Apr.....	9.85	528	37	41	301.9	980	49.2	193	203	98	59.1	134.0	114.4	4.42
May.....	9.81	481	36	42	314.9	984	59.4	201	191	101	63.1	165.4	116.6	8.90
June.....	9.73	470	37	50	294.9	886	59.9	185	192	103	63.6	141.4	124.5	5.20
July.....	9.85	451	39	62	296.7	951	47.5	178	193	107	61.5	159.5	132.6	7.22
Aug.....	10.14	276	40	65	295.3	924	60.7	178	195	108	64.3	144.8	135.5	0.22
Sept.....	10.19	140	35	70	235.8	962	59.9	221	216	109	66.9	161.0	132.0	1.75
Oct.....	10.27	230	37	90	261.9	1,007	64.5	265	212	109	71.0	173.8	127.5	2.21
Nov.....	10.22	406	35	72	203.3	883	61.9	226	196	114	72.3	200.4	134.0	1.55
Dec.....	10.78	519	34	71	244.2	1,067	52.6	230	244	121	74.2	283.3	180.4	23.45
1937														
Jan.....	11.13	400	33	38	201.7	1,150	43.0	222	240	115	76.6	190.9	201.7	17.80
Feb.....	11.23	384	30	38	290.9	1,134	41.6	233	278	116	79.5	249.5	207.7	4.97
Mar.....	11.34	519	42	69	570.6	1,414	51.8	257	307	118	82.5	294.2	192.4	8.15
Apr.....	11.81	553	48	48	683.7	1,344	68.1	269	287	118	83.7	208.3	219.8	9.77
May.....	11.51	540	40	44	969.2	1,304	49.0	289	285	118	84.3	242.0	234.2	4.73
June.....	11.33	521	46	59	826.5	1,269	44.7	265	286	114	76.6	228.2	227.6	0.54
July.....	11.27	451	46	61	889.4	1,187	47.0	267	265	114	82.9	204.0	190.5	1.03
Aug.....	11.19	405	42	50	836.3	1,108	61.4	278	246	117	85.7	257.5	180.9	1.47
Sept.....	10.96	176	32	59	542.7	1,048	37.0	297	233	111	83.7	231.8	187.2	1.21
Oct.....	10.85	338	30	..	.....	792	....	333	224	103	68.4	185.2	180.8	1.35
Nov.....	....	...	..	..	.....	587	....	...	...	90	49.1	128.0	163.5	0.27
Dec.....	....	...	..	..	.....	...	....	...	...	...	.....	.....	.....	....

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nomics. 7 and 9. Iron and Steel Foreign Trade, reported by Bureau of Foreign and Domestic Commerce. 8. Shipments of Finished Steel, United States Steel Corp. 10 and 11. Foreign Trade, Value of Exports and Imports, reported by Bureau of Foreign and Domestic Commerce. 12. Index of Industrial Production (adjusted for seasonal variation; average 1923-25=100) computed by Federal Reserve Board. 13. Blast Furnace Production Rate, compiled by STEEL. 14. Index of Foundry Equipment Orders (Average 1922-24=100), compiled by American Foundry Equipment association. 15. Index of Machine Tool Orders (Three-month moving average; average monthly shipments 1926=100), compiled by National Machine Tool Builders association. 16. Railroad Freight Car Orders, compiled by STEEL. Figures for Charts 3 and 4 appear on pages 296 and 297.

District Steel Rates Reflect Obstacles To Stable Operations in 1937

■ Charts based upon the rates of steelworks operations reported weekly in STEEL for the 12 leading districts afford an interesting study of the distinctive characteristics of the trend of production in each locality.

The most noticeable features are the uniformity with which all districts felt the effect of diminishing demand in the final quarter and the extent to which operations in several sections were affected by the abnormal factors of floods and strikes.

Signs of a slackening in the pace of operations are discernible in the trends lines for some districts as early as July, but the general downward movement was not pronounced until late in September or early October. In October the rate for every district had established a definite trend to lower levels.

Districts affected by high water were Cincinnati, New England and Wheeling. The raging Ohio caused a suden drop of 47 points in the rate of operations in the Cincinnati district in the week ending Jan. 30. After three weeks of curtailed operations, production snapped back to 60 per cent.

Concurrently Wheeling's rate dived from 93½ to 41 per cent. Recovery here was rapid, as the rate rose to 77 per cent in the second week and to 80 in the third.

In the week ending May 29, New England suffered serious floods which caused the district's operating rate to drop from 100 to 55 per cent. It was down to 45 per cent in the following two weeks.

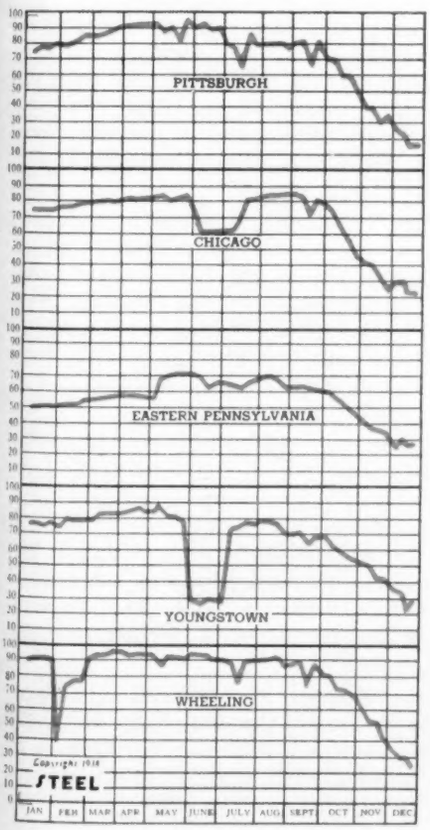
While strikes were numerous and widely distributed in 1937, their effect upon the rate of steelworks operations was severe and prolonged only in three districts. Losses ranging from 12 to 50 points and extending over five or six weeks are reflected in the charts for the Chicago, Youngstown and Cleveland districts.

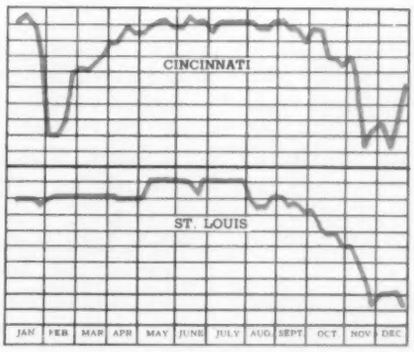
Detroit, St. Louis, Birmingham, Eastern Pennsylvania, Buffalo and Chicago enjoyed a greater degree of stability than the other districts. From January through September (before operations in all districts began to decline) the rates in these districts fluctuated through comparatively narrow ranges. During this period, Detroit's high was 100, its low 86; St. Louis high 94, low 74; Birmingham 96 and 74; Eastern Pennsylvania 73½ and 52; Buffalo 93 and 70; and Chicago 86½ and 63.

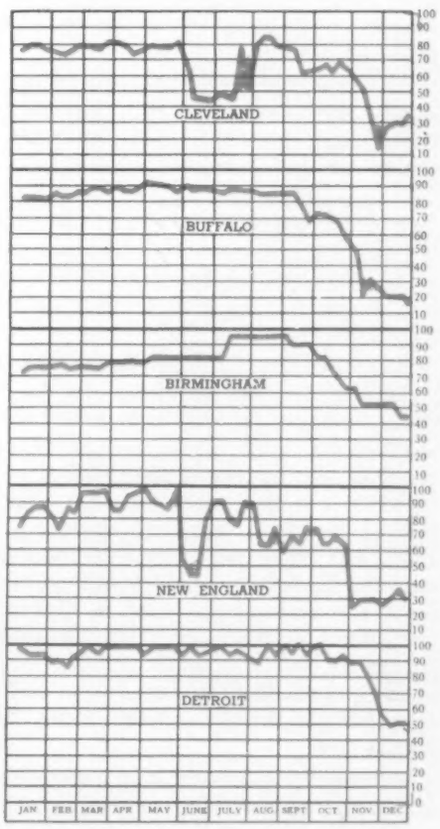
■

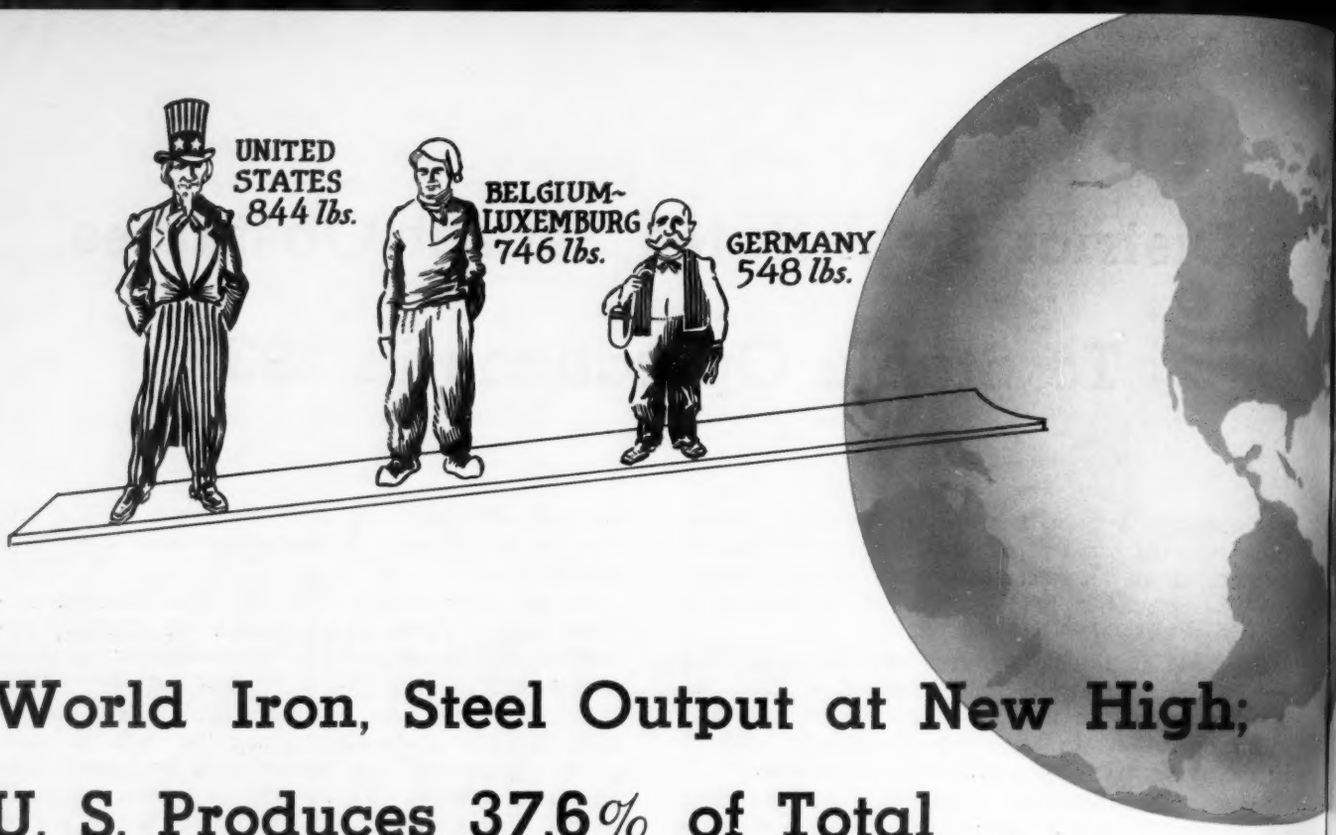
Rates of Steelworks Operations by Districts

Charts are based upon STEEL'S weekly reports on the percentage of open-hearth ingot capacity engaged in each of 12 leading producing areas









World Iron, Steel Output at New High; U. S. Produces 37.6% of Total

BY VINCENT DELPORT,
European Manager, STEEL

■ For the second consecutive year, all prior records of world steel production were exceeded in 1937.

With the possible exception of Spain, for which country reliable statistics are not at present available, every nation producing steel surpassed its 1936 output, and many made more steel than at any previous time.

As estimated by STEEL, world production of steel ingots and castings in 1937 amounted to 133,844,000 gross tons, against 122,331,000 tons in 1936, an increase of 9.41 per cent.

Estimated output of pig iron and ferroalloys exceeded for the first time the 100-million mark, with 102,035,000 gross tons, or 13.5 per cent more than in 1936, when the total was 89,887,000 tons. The previous record for pig iron production was in 1929 with 97,073,000 tons.

Although the United States' production of both steel and pig iron advanced for the fifth consecutive year, tonnages in 1937 were still below the top mark reached in 1929. The output of steel ingots and castings was approximately 6.35 per cent higher than in 1936, but 8.54 per cent less than in 1929. Output of pig iron was 19.5 per cent higher than in 1936, but 12.98 per cent less than in 1929. If production had been maintained at the summer rate until the end of the year, a different report might have been written. As it is, the share of the United States in world production was 38.55 per cent for steel—practically the same as in 1936—and 36.34 per cent for pig iron, compared with 34.52 per cent in 1936.

European nations in 1937 produced 71,970,000 tons of steel, or 10.1 per cent more than in 1936, and 57,520,000 tons of pig iron, an increase of 10.6 per cent.

In 1937, the amount of pig iron produced in the world was 76.23 per cent of the total steel output. In 1936 the proportion was 73.47 per cent.

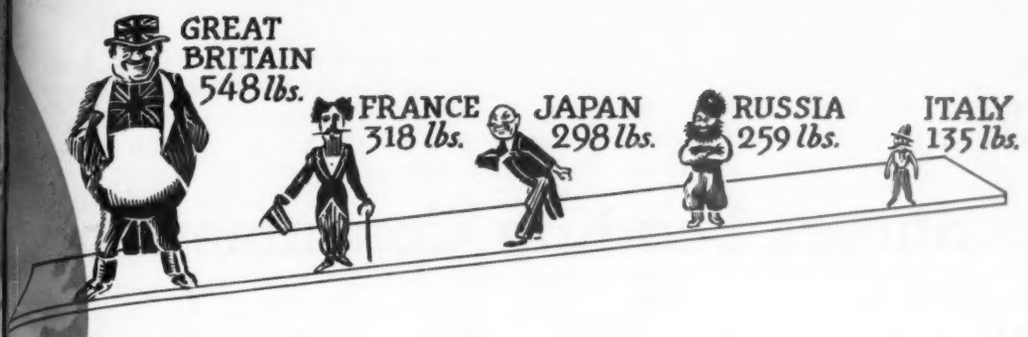
In Europe, Germany kept first rank as a steelmaking nation and exceeded all its previous records, even of pre-war years within the boundaries then existing. Germany also preserved the first rank for pig iron output, which constituted a post-war record. Russia came next, also with a record production, both in steel and pig iron.

The third country in Europe to exceed an output of 10 million tons of steel was Great Britain, which country also ranked third in pig iron output. Although Britain produced more iron in pre-war years —in fact, as far back as 1896—British steel capacity was taxed almost to capacity throughout the past year, and the industry attained an all-time record for steel output.

Of the other principal steel-producing countries of Europe, France came fourth, Belgium fifth, Luxemburg sixth, followed closely by Czechoslovakia, Italy, Poland and Sweden. For pig iron these nations ranked in the same order. Czechoslovakia, Poland, Sweden and Hungary each produced more steel in 1937 than in any previous year, and Czechoslovakia, Italy and Sweden exceeded previous records for pig iron.

Outside Europe, advances in iron and steel production were made by Japan, Canada, India and Australia. All these countries had a record year in pig iron output, and for steel also—with the excep-

(*Please turn to Page* 370)



World Production of Steel Ingots and Castings

Gross Tons

	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928
United States	51,609,000	48,525,000	34,467,000	26,502,000	23,232,000	13,681,000	25,945,000	40,699,000	56,433,000	51,544,000
Canada	1,445,000	1,078,000	915,000	741,000	403,000	335,000	671,000	1,009,000	1,391,000	1,240,000
Great Britain	12,900,000	11,785,000	9,859,000	8,850,000	7,024,000	5,261,000	5,203,000	7,326,000	9,636,000	8,520,000
France	7,825,000	6,601,000	6,177,000	6,075,000	6,427,000	5,550,000	7,697,000	9,296,000	9,544,000	9,348,000
Belgium	3,850,000	3,124,000	2,975,000	2,901,000	2,687,000	2,745,000	3,073,000	3,300,000	4,066,000	3,872,000
Luxemburg	2,540,000	1,949,000	1,808,000	1,901,000	1,815,000	1,925,000	2,002,000	2,234,000	2,659,000	2,526,000
Italy	2,100,000	1,992,000	2,174,000	1,820,000	1,755,000	1,369,000	1,430,000	1,746,000	2,109,000	1,932,000
Spain	350,000	365,000	555,000	635,000	498,000	525,000	594,000	910,000	985,000	770,000
Sweden	1,060,000	962,000	882,000	848,000	620,000	520,000	530,000	601,000	683,000	567,000
Germany*	19,380,000	18,900,000	16,184,000	11,725,000	7,690,000	5,678,000	8,136,000	11,354,000	15,986,000	14,285,000
Austria	625,000	411,000	358,000	304,000	222,000	201,000	317,000	461,000	622,000	626,000
Czechia	2,290,000	1,535,000	1,135,000	938,000	749,000	662,000	1,490,000	1,721,000	2,103,000	1,704,000
Poland	1,385,000	1,123,000	930,000	831,000	805,000	542,000	1,020,000	1,217,000	1,355,000	1,226,000
Hungary	665,000	543,000	439,000	310,000	224,000	177,000	311,000	363,000	505,000	478,000
Russia	17,000,000	16,078,000	12,320,000	9,412,000	6,790,000	5,900,000	5,333,000	5,610,000	4,828,000	4,206,000
Japan	6,000,000	4,944,000	4,858,000	3,682,000	3,150,000	2,300,000	1,834,000	2,288,000	2,249,000	1,840,000
India	1,100,000	866,000	862,000	798,000	694,000	570,000	625,000	619,000	575,000	410,000
Australia	870,000	750,000	697,000	518,000	393,000	221,000	360,000	420,000	460,000	462,000
Saar†	..	..	..	1,919,000	1,649,000	1,440,000	1,513,000	1,904,000	2,174,000	2,040,000
Miscellaneous	850,000	800,000	750,000	450,000	350,000	300,000	350,000	400,000	400,000	350,000
WORLD TOTAL	133,844,000	122,331,000	98,345,000	81,160,000	67,177,000	49,902,000	68,434,000	93,478,000	118,763,000	108,134,000

*Includes the Saar from 1935 onward. †Included with Germany for 1935, 1936 and 1937. Japan's figures include Manchuria and Korea.

World Production of Pig Iron

Gross Tons

	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928
United States	37,080,000	31,029,000	21,373,000	16,139,000	13,346,000	8,781,000	18,426,000	31,752,000	42,614,000	38,156,000
Canada	965,000	747,000	655,000	438,000	258,000	160,000	466,000	813,000	1,160,000	1,083,000
Great Britain	8,500,000	7,721,000	6,424,000	5,969,000	4,136,000	3,574,000	3,773,000	6,192,000	7,589,000	6,611,000
France	7,825,000	6,130,000	5,696,000	6,053,000	6,223,000	5,448,000	8,068,000	9,874,000	10,198,000	9,821,000
Belgium	3,850,000	3,156,000	2,982,000	2,860,000	2,667,000	2,705,000	3,180,000	3,311,000	4,030,000	3,843,000
Luxemburg	2,540,000	1,955,000	1,842,000	1,968,000	1,858,000	1,929,000	2,020,000	2,433,000	2,860,000	2,726,000
Italy	865,000	793,000	683,000	564,000	544,000	481,000	532,000	569,000	718,000	545,000
Spain	250,000	250,000	350,000	365,000	334,000	296,000	468,000	606,000	740,000	552,000
Sweden	670,000	623,000	603,000	550,000	341,000	277,000	411,000	488,000	516,000	431,000
Germany*	15,700,000	15,058,000	12,637,000	8,602,000	5,183,000	3,870,000	5,964,000	9,540,000	13,187,000	11,615,000
Austria	320,000	244,000	190,000	132,000	87,000	93,000	143,000	282,000	455,000	451,000
Czechia	1,660,000	1,122,000	798,000	591,000	491,000	443,000	1,146,000	1,414,000	1,618,000	1,544,000
Poland	690,000	575,000	388,000	376,000	301,000	196,000	341,000	470,000	693,000	673,000
Hungary	350,000	301,000	183,000	138,000	92,000	65,000	157,000	253,000	362,000	281,000
Russia	14,300,000	14,088,000	12,411,000	10,273,000	7,085,000	6,101,000	4,782,000	4,920,000	4,253,000	3,322,000
Japan	3,000,000	2,882,000	2,739,000	2,400,000	2,019,000	1,525,000	1,385,000	1,635,000	1,491,000	1,520,000
India	1,750,000	1,543,000	1,466,000	1,331,000	1,065,000	914,000	1,072,000	1,180,000	1,348,000	1,055,000
Australia	720,000	670,000	698,000	487,000	336,000	190,000	380,000	308,000	420,000	410,000
Saar†	..	..	..	1,797,000	1,567,000	1,327,000	1,491,000	1,881,000	2,071,000	1,905,000
Miscellaneous	1,000,000	1,000,000	800,000	700,000	600,000	700,000	800,000	750,000	750,000	850,000
WORLD TOTAL	102,035,000	89,887,000	72,918,000	61,733,000	48,533,000	39,075,000	55,005,000	78,671,000	97,073,000	87,394,000

*Includes the Saar from 1935 onward. †Included with Germany for 1935, 1936 and 1937. Japan's figures include Manchuria and Korea.

Exports and Imports of the Principal Countries

(Gross tons—Scrap eliminated)

	EXPORTS					IMPORTS				
Country	1937	1936	1935	1934	1913	1937	1936	1935	1934	1913
United States	3,400,000	1,222,000	1,020,000	997,000	2,648,000	500,000	525,000	405,000	272,000	273,000
Great Britain	2,600,000	2,205,000	2,372,000	2,253,000	4,969,000	1,800,000	1,483,000	1,152,000	1,367,000	2,331,000
Germany§	3,710,000	3,550,000	3,089,000	2,429,000	6,200,000*	475,000	508,000	635,000	1,377,000	300,000*
France‡	2,050,000	1,575,000	1,842,000	3,030,000	640,000	170,000	173,000	170,000	200,000	185,000
Belgium and Luxemburg	4,000,000	3,189,000	3,129,000	3,345,000	1,550,000†	445,000	404,000	297,000	306,000	874,000†
Total	15,760,000	11,741,000	11,452,000	12,054,000	16,007,000	3,390,000	3,093,000	2,659,000	3,522,000	3,963,000

*Includes Saar and Luxemburg. †Belgium only. ‡Includes Saar for 1934. §Includes the Saar for 1935, 1936 and 1937.

Distribution Shows Leading Consumers of Cold Finished Carbon Steel Bars

Automobile, Machinery, Home and Office Appliance and Farm Implement Industries Take 50 Per Cent of Output of Cold Finished Bar Industry

■ Through the cooperation of leading producers, STEEL is able to present herewith an analysis of the distribution of cold finished carbon steel bars.

The distribution to consuming classifications in tons and in per cent, shown in Tables I and II, is based upon the reports of shipments by 13 producers whose production is believed to represent approximately 90 per cent of the total output for the cold finished steel bar industry.

Figures are given for the years 1936 and 1937.

TABLE I

Distribution of Cold Finished Carbon Steel Bars by Individual Consuming Classifications

	1937		1936	
	Tons	Per cent	Tons	Per cent
Jobbers	130,044	21.51	129,654	22.27
Automobiles	122,997	20.34	127,244	21.86
Screw machine products	115,196	19.05	115,690	19.87
Miscellaneous	53.323	8.82	49,733	8.54
Agricultural, including tractors and lawn mowers	47,043	7.78	36,783	6.32
Machinery, not otherwise Classified	40,564	6.71	35,501	6.10
Electrical	30,798	5.09	25,982	4.46
Domestic mechanical appliances	16,583	2.75	17,680	3.04
Elevating, conveying and transmission	16,488	2.73	16,642	2.86
Mechanical office appliances	11,136	1.84	11.412	1.96
Textile	9,549	1.58	7.077	1.22
Printing press and allied trades	5,321	0.88	4,303	0.74
Railroads	3,580	0.59	3,274	0.56
Exports	2,004	0.33	1,166	0.20
Totals	604,626	100.00	582,141	100.00

Those for 1936 are based on actual reported shipments; those for 1937 are based upon actual reported shipments for 11 months, with shipments for the months of December estimated.

This first published study of the destination of cold finished carbon steel bars shows that the leading ultimate consumers of this important quality steel product in the order of tonnage consumed are the automobile industry, the machinery industries, agricultural implement manufacturers, and manufacturers of mechanical appliances used in homes, offices and other buildings. These four major groups consumed 49.70 per cent of the total output shipped in 1937.

More than 40 per cent of the total tonnage goes to jobbers and to manufacturers of screw machine products, who in turn redistribute the product to consumers for ultimate use.

The distribution in order of tonnage by individual classifications and without regarding to grouping in major classifications is shown in Table I.

A study of this table reveals only moderate shifts during the two years. The most pronounced gain in consumption was that registered by the agricultural classification. Increases in their percentages, all in small amount, also were recorded for machinery not otherwise classified, electrical equipment, textile machinery, printing press and allied trades, railroads, exports and miscellaneous.

Minor losses were sustained in the proportion of consumption by jobbers, automobiles, screw machine products, domestic mechanical appliances, elevating conveying and transmission machinery and mechanical office appliances.

■ Comparison of the distribution of cold finished carbon steel bars with that of all finished steel products and with that of hot rolled bars shows that the cold finished bar industry's markets differ in

several important respects from the markets for hot rolled finished steel products.

These differences are shown in Table III. The entries in the first two columns are from STEEL's analysis of the distribution of finished rolled steel for 1936. In the third and fourth columns figures from Table II have been entered as nearly as possible in the appropriate consuming classifications used by STEEL in its annual distribution of finished rolled steel.

of the cold finished carbon steel bar output for that year.

On the other hand, manufacturers of household appliances, office equipment, etc. took 5 per cent of the cold finished bar production in 1937, as compared with only 1.80 per cent of the hot rolled bar output and 3.90 per cent of all finished rolled steel.

The important automobile industry appears to take about one-fifth of the cold fiished bar output and an identical proportion of all finished rolled

TABLE II

Distribution of Cold Finished Carbon Steel Bars, 1936 and 1937

(Based upon Reports of Companies Accounting for Approximately 90 Per Cent of Total Production)

	1937			1936		
	Tons		Per Cent	Tons		Per Cent
Railroads		3,580	0.59		3,274	0.56
Building furnishings:						
(a) Domestic mechanical appliances	16,583		2.75	17,680		3.04
(b) Mechanical office appliances	11,136		1.84	11,412		1.96
Total building furnishings		27,719	4.59		29,092	5.00
Automobile		122,997	20.34		127,244	21.86
Agricultural, including tractors and lawn mowers		47,043	7.78		36,783	6.32
Machinery:						
(a) Electrical	30,798		5.09	25,982		4.46
(b) Elevating, conveying, transmission	16,488		2.73	16,642		2.86
(c) Printing press and allied trades	5,321		0.88	4,303		0.74
(d) Textile	9,549		1.58	7,077		1.22
(e) Machinery, not classified above	40,564		6.71	35,501		6.10
Total machinery		102,720	16.99		89,505	15.38
Exports		2,004	0.33		1,166	0.20
Miscellaneous		53,323	8.82		49,733	8.54
Total distributed to ultimate consumers		359,386	59.44		336,797	57.86
Undistributed to ultimate consumers:						
Jobbers	130,044		21.51	129,654		22.27
Screw machine products	115,196		19.05	115,690		19.87
Total undistributed		245,240	40.56		245,344	42.14
GRAND TOTAL		604,626	100.00		582,141	100.00

It is obvious that Columns 3 and 4 are not strictly comparable with Columns 1 and 2 for the reason that almost a fifth of the cold finished carbon steel bar consumption is credited to screw machine products, whereas the percentage of products in Columns 1 and 2 which went into screw machine products was credited to its ultimate consuming classifications. If it were possible to redistribute the one-fifth of cold finished bars in comparable manner, it would have the effect of increasing the consumption shown for automobiles, agricultural implements, and other consuming industries which are large purchasers of screw machine products.

But even without allowing for this known discrepancy, the figures indicate quite clearly how the cold finished bar market differs from the other two.

■ For instance, railroads, which in 1936 took 11.33 per cent of all finished rolled steel and 6.82 per cent of hot rolled bars, accounted for only 0.56 per cent steel. However, its consumption of hot rolled bars was 35.79 per cent of the total. Further breakdown of the 19.05 per cent of cold finished bars going into screw machine products undoubtedly would lift the consumption credited to automobiles substantially—possibly to around 35 per cent.

Agricultural implement manufacturers take a much higher proportion of the output of cold finished bars than of hot rolled bars or of all finished rolled steel. This is even more pronounced in the case of the machinery group, and also in the proportions which are distributed through jobbers.

The export market for cold finished bars is negligible. In 1936 only 0.20 per cent of the output was shipped abroad. In the same year 3.79 per cent of the total output of hot rolled finished steel and 1.12 per cent of the production of hot-rolled bars was exported.

■ Establishment of a series of reports of the dis-

tribution of cold finished carbon steel bars will pave the way for comparisons from year to year. Such comparisons, when available for a span of a decade or more, will show trends representing changes in buying habits, the rise or fall of specific markets and other shifts in consumption of significance to buyers and sellers.

STEEL's editors take this opportunity to express their appreciation to the producers of cold finished carbon steel bars for their co-operation in making it possible to inaugurate this latest addition to the distribution statistics of the iron and steel industry.

Analysis of Distribution for 1937 Postponed

■ Figures showing the distribution of finished rolled steel by consuming industries, which have been a feature of the "Yearbook of Industry" numbers of this publication for many years, do not appear in this issue. The distribution statistics for 1937 will be presented at a later date. Postponement of the analysis will permit the introduction of improvements and refinements which were impossible under the old method of presentation.

Publication of the figures annually since 1922, when the series was inaugurated by *Iron Trade Review*, predecessor of STEEL, was made possible by the co-operation of leading producers of finished rolled steel who went to great care to segregate their shipments according to consuming classifications and to report their figures to this publication for compilation. In order that the analysis could be prepared in time for presentation in the first issue of January it was necessary for producers to base their reports upon actual shipments for the first 11 months, with shipments and distribution for December estimated.

This practice involved considerable high-pressure work in December at a time when the accounting staffs already were burdened with a heavy load of year-end duties. It also introduced a factor of error due to the necessity of estimating tonnage and distribution for December.

■ Recently a poll of producers disclosed an overwhelming preference for withholding the reports on distribution until after the end of the year, so that actual figures for the final month, instead of estimates, could be employed and also so that the work of compilation could be performed under less pressure.

Recognizing the advantages of this proposal, the editors of STEEL have changed their plans accordingly. The annual analysis will be presented as soon as possible after the reports are available, which probably will be in February or March.

—THE EDITORS

TABLE III

Comparison of Distribution of All Finished Steel, Hot Rolled Bars and Cold Finished Carbon Steel Bars

	All Finished Steel* 1936	Hot Rolled Bars† 1936	Cold Finished Bars‡ 1936	Cold Finished Bars‡ 1937
1. Railroads				
(a) Cars and locomotives	4.81	5.32	0.56	0.59
(b) Track construction and repair	5.71	0.76	...	...
(c) Buildings and bridges	0.81	0.74	...	...
2. Buildings				
(a) Erection materials, framework, trim, etc.	8.29	4.94	...	...
(b) Furnishings, furniture, stoves, refrigerators, etc.	3.90	1.80	5.00	4.59
(c) Other miscellaneous products for buildings	1.68	1.22	...	...
3. Highways and highway bridges	1.72	0.46	...	...
4. Automotive	20.87	35.79	21.86	20.34
5. Oil, gas and water	5.33	0.59	...	...
6. Mining, quarrying, lumbering	0.63	0.49	...	...
7. Agriculture				
(a) Implements	2.66	9.29	6.32	7.78
(b) Other agricultural uses	0.91	0.08	...	...
8. Shipbuilding and repair	0.80	0.50	...	...
9. Machinery, tools and equipment, including electrical	4.96	8.67	15.38	16.99
10. Food and packing industry, all containers	8.44	0.12	...	...
11. Exports	3.79	1.12	0.20	0.33
12. Miscellaneous	10.56	18.76	8.54	8.82
Jobbers	14.13	9.35	22.27	21.51
Screw machine products	...	...	19.87	19.05
Total	100.00	100.00	100.00	100.00

(*) From STEEL's distribution of finished steel, page 337, Jan. 4, 1937 issue.

(†) "Bars, except concrete bars and shapes under 3 inches," from STEEL's distribution of finished steel, page 337, Jan. 4, 1937 issue.

(‡) From Table II, p. 293, this issue.

AMERICAN INDUSTRY

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• This superior iron, in the form of 40-pound pigs, is saving money and aiding quality in all industries requiring pig iron.

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P M

STEEL INGOT PRODUCTION, 1918-1937

Compiled by American Iron and Steel Institute

	—1918—		—1919—		—1920—		—1921—	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	2,641,196	97,822	3,650,845	135,216	3,524,026	130,519	2,517,042	96,809
February	2,724,962	113,540	3,177,311	132,388	3,401,760	141,740	1,998,705	83,279
March	3,727,632	143,370	3,127,481	120,288	3,916,960	145,073	1,794,777	66,473
April	3,791,184	145,815	2,631,087	101,196	3,132,458	120,479	1,386,897	53,342
May	3,939,580	145,910	2,266,109	83,930	3,423,178	131,661	1,446,181	55,622
June	3,695,352	147,814	2,607,015	104,281	3,538,971	136,114	1,146,350	44,090
July	3,731,532	143,520	2,946,465	113,326	3,327,785	127,992	917,824	36,713
August	3,695,632	136,875	3,225,942	124,075	3,562,411	137,016	1,300,199	48,156
September	3,832,228	153,289			3,561,365	136,976	1,342,092	51,619
October	4,017,435	148,794	10,062,540	96,755	3,580,873	137,726	1,847,139	71,044
November	3,668,164	141,083			3,132,891	120,496	1,896,483	72,942
December	3,586,125	143,445			2,778,714	106,874	1,630,395	62,707
Total	43,051,022	*138,428	33,694,795	*108,343	40,881,392	*131,030	19,224,084	*61,814

	—1922—		—1923—		—1924—		—1925—	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	1,891,857	72,764	3,841,095	142,263	3,649,913	135,182	4,193,281	155,307
February	2,071,772	86,324	3,471,843	144,660	3,826,246	153,050	3,752,352	156,348
March	2,814,667	104,247	4,066,680	150,618	4,206,699	161,796	4,194,340	161,321
April	2,902,240	116,090	3,963,736	158,549	3,348,466	128,787	3,583,676	137,834
May	3,218,794	119,215	4,216,355	156,161	2,640,034	97,779	3,454,971	132,883
June	3,127,775	120,299	3,767,256	144,894	2,065,676	82,627	3,204,451	123,248
July	2,952,806	118,112	3,531,458	141,258	1,877,789	72,223	3,084,472	118,634
August	2,629,256	97,380	3,695,788	136,881	2,552,891	98,188	3,420,998	131,577
September	2,818,261	108,395	3,356,776	134,271	2,827,625	108,755	3,489,565	134,214
October	3,410,265	131,164	3,577,091	132,485	3,125,418	115,756	3,888,814	144,030
November	4,430,309	131,935	3,134,321	120,551	3,121,149	124,846	3,902,900	156,116
December	3,300,416	132,017	2,863,266	114,531	3,569,251	137,279	3,970,918	152,728
Total	34,568,418	*111,511	43,485,665	*139,825	36,811,157	*117,984	44,140,738	*141,932

	—1926—		—†1927—		—†1928—		—†1929—	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	4,132,210	158,931	3,789,874	145,764	3,990,902	153,496	4,500,131	166,672
February	3,785,051	157,710	3,812,046	158,835	4,043,457	161,738	4,328,713	180,363
March	4,468,617	165,504	4,535,272	167,973	4,507,217	166,934	5,068,176	194,930
April	4,105,799	157,915	4,127,335	158,744	4,305,382	172,215	4,950,053	190,387
May	3,927,979	151,076	4,047,251	155,663	4,207,212	155,823	5,286,246	195,787
June	3,734,153	143,621	3,495,609	134,446	3,743,903	143,996	4,902,955	196,118
July	3,634,993	139,807	3,204,135	128,165	3,805,598	152,224	4,850,583	186,561
August	3,986,966	153,345	3,498,549	129,576	4,178,610	154,763	4,939,086	182,929
September	6,913,383	150,515	3,268,881	125,726	4,147,893	165,916	4,527,887	181,115
October	4,074,544	156,713	3,316,292	127,550	4,649,968	172,220	4,534,326	167,938
November	3,705,744	142,529	3,127,015	120,270	4,266,835	164,109	3,521,111	135,427
December	3,466,766	133,337	3,175,484	122,134	4,018,208	160,728	2,903,012	116,120
Total	46,936,205	*150,920	43,397,743	*139,543	49,865,185	*160,338	54,312,279	*174,638

	—†1930—		—†1931—		—†1932—		—†1933—	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	3,778,235	139,935	2,512,140	93,042	1,484,991	57,115	1,016,870	39,110
February	4,035,111	168,130	2,547,027	106,126	1,481,253	59,250	1,073,012	44,709
March	4,254,331	163,620	3,054,339	117,475	1,433,337	53,087	898,236	33,268
April	4,109,492	158,057	2,766,959	106,421	1,259,629	48,447	1,335,422	53,817
May	3,982,915	147,515	2,551,633	98,140	1,125,243	43,279	1,976,428	73,201
June	3,418,535	136,741	2,127,762	81,837	912,757	35,106	2,564,420	98,632
July	2,922,220	112,393	1,887,580	72,599	806,722	32,269	3,168,354	126,734
August	3,060,763	117,722	1,716,829	66,032	846,730	31,360	2,863,569	106,058
September	2,840,379	109,245	1,545,411	59,439	991,858	38,148	3,283,079	87,811
October	2,692,539	99,724	1,590,180	58,896	1,087,508	41,810	2,084,894	80,188
November	2,212,220	88,489	1,591,644	63,666	1,032,221	39,701	1,521,189	58,507
December	1,979,547	76,136	1,301,211	50,047	861,034	33,117	1,798,606	71,944
Total	39,286,287	*126,322	25,192,715	*81,006	13,322,833	*42,701	22,594,079	*72,884

	—†1934—		—†1935—		—†1936—		—1937—	
	Total	Daily Av.	Total	Daily Av.	Total	Wkly. Av.	Total	Wkly. Av.
January	1,997,129	73,968	2,870,161	106,302	3,039,804	686,186	4,724,939	1,066,578
February	2,211,944	92,164	2,774,271	115,595	2,956,891	714,225	4,413,832	1,103,458
March	2,798,440	103,646	2,865,292	110,204	3,333,853	752,563	5,216,666	1,177,577
April	2,936,064	117,443	2,640,602	101,562	3,932,605	914,593	5,071,875	1,182,255
May	3,399,494	125,907	2,633,661	97,543	4,037,375	911,371	5,153,559	1,163,332
June	3,059,483	117,672	2,258,664	90,347	3,975,569	926,706	4,183,762	975,236
July	1,489,453	59,578	2,267,827	87,224	3,914,370	885,604	4,556,596	1,030,904
August	1,381,350	51,161	2,915,930	107,997	4,184,287	944,534	4,875,671	1,100,603
September	1,268,977	50,759	2,825,004	113,000	4,151,388	969,950	4,301,869	1,005,110
October	1,481,902	54,885	3,142,759	116,398	4,534,246	1,023,532	3,392,691	765,844
November	1,610,625	61,947	3,150,409	121,170	4,323,025	1,007,698	2,153,781	502,047
December	1,964,257	78,570	3,073,405	122,936	4,424,367	1,000,988	.....	.....
Total	25,599,118	*82,312	33,417,985	*107,453	46,807,780	*895,329	‡48,045,241	*1,006,815

*Average. †Beginning with 1927, the Institute excludes crucible and electric ingots, which totaled 675,123 tons in 1927, 810,029 tons in 1928, 958,076 tons in 1929, 614,852 tons in 1930, 412,489 tons in 1931, 241,756 tons in 1932, 421,884 tons in 1933, 361,827 tons in 1934, 542,134 tons in 1935 and 773,271 tons in 1936. ‡Eleven months.

PIG IRON PRODUCTION, 1888-1937

Coke and Anthracite Iron in Gross Tons; Annual Statistics by American Iron and Steel Institute, Monthly Statistics by STEEL

Coke and Anthracite Iron in Gross Tons; Annual Statistics by American Iron and Steel Institute, Monthly Statistics by STEEL

Year	Tons	Year	Tons	Year	Tons	Year	Tons	Year	Tons	Year	Tons
1888	5,955,105	1893	6,737,713	1898	11,477,184	1903	17,503,568	1908	15,686,872	1913	30,626,171
1889	7,028,374	1894	6,434,966	1899	13,335,937	1904	16,157,504	1909	25,419,468	1914	23,068,320
1890	8,574,558	1895	9,220,967	1900	13,404,760	1905	22,639,452	1910	26,907,060	1915	29,620,061
1891	7,702,906	1896	8,311,833	1901	15,494,913	1906	24,874,184	1911	23,370,871	1916	39,062,386
1892	8,619,379	1897	9,397,469	1902	17,431,138	1907	25,343,964	1912	29,379,912	1917	38,244,691

	Stacks No.	Stacks In	Output Total	Output Av. daily	Stacks No.	Stacks In	Output Total	Output Av. daily	Stacks No.	Stacks In	Output Total	Output Av. daily	Stacks No.	Stacks In	Output Total	Output Av. daily
	1918				**1919**				**1920**				**1921**			
Jan.	435	294	2,403,227	77,533	435	330	3,306,279	106,654	432	285	3,012,373	97,172	435	184	2,414,753	77,895
Feb.	435	319	2,318,242	82,723	435	311	2,943,347	105,120	432	305	2,984,257	102,904	436	155	1,929,394	68,906
March	438	338	3,209,996	103,548	435	279	3,088,023	99,614	433	315	3,375,768	108,895	436	103	1,594,866	51,447
April	437	351	3,273,355	109,112	435	216	2,474,374	82,479	433	278	2,752,670	91,754	436	96	1,190,751	39,691
May	437	360	3,451,884	111,351	433	197	2,107,729	67,991	433	297	2,991,825	96,510	436	90	1,215,272	39,202
June	437	353	3,316,148	110,538	433	199	2,114,028	70,467	433	302	3,046,623	101,553	436	74	1,064,007	35,466
July	437	364	3,408,584	109,954	434	240	2,424,212	78,200	434	291	3,043,918	98,190	435	69	864,642	27,892
Aug.	438	371	3,378,479	108,983	432	266	2,742,081	88,453	434	306	3,145,536	101,468	435	69	954,901	30,802
Sept.	438	364	3,413,223	113,774	432	163	2,480,790	82,692	434	317	3,124,308	104,143	435	84	985,795	32,859
Oct.	437	364	3,482,392	112,335	432	216	1,864,424	60,142	435	290	3,288,341	106,075	435	95	1,234,450	39,821
Nov.	437	360	3,347,844	111,595	432	252	2,407,369	80,244	435	255	2,935,081	97,836	429	120	1,414,958	47,165
Dec.	435	351	3,434,114	110,778	431	262	2,626,074	84,711	435	202	2,700,268	87,105	429	123	1,642,775	52,992
Total			38,437,488	*105,308			30,578,730	*83,777			36,400,968	*99,456			16,506,564	*45,223
	1922				**1923**				**1924**				**1925**			
Jan.	430	127	1,645,804	53,099	428	261	3,228,226	104,136	414	248	3,015,480	97,273	411	251	3,372,207	108,781
Feb.	429	139	1,630,180	58,220	424	278	2,993,918	106,925	414	263	3,073,619	105,987	411	256	3,214,067	114,788
March	429	155	2,035,908	65,674	424	295	3,523,595	113,664	410	269	2,465,389	111,787	410	246	3,571,422	115,207
April	429	161	2,070,161	69,005	423	311	3,546,308	118,210	410	234	3,226,107	107,537	409	221	3,211,235	107,041
May	427	175	2,309,348	74,495	423	322	3,868,486	124,790	411	187	2,619,986	84,515	405	196	2,933,907	94,642
June	427	191	2,362,455	78,748	424	322	3,667,868	122,262	411	158	2,022,836	67,427	399	191	2,679,045	89,301
July	427	170	2,403,030	77,517	418	299	3,684,677	118,860	411	145	1,783,457	57,531	397	188	2,665,262	85,976
Aug.	427	143	1,810,665	58,408	418	270	3,448,886	111,254	411	150	1,882,986	60,741	392	192	2,707,171	87,328
Sept.	427	189	2,024,008	67,466	418	254	3,117,526	103,917	411	174	2,053,617	68,454	388	200	2,725,885	90,862
Oct.	428	218	2,629,655	84,827	418	245	3,142,646	101,375	411	182	2,461,727	79,410	387	209	3,017,889	97,351
Nov.	428	241	2,846,110	94,870	418	229	2,891,191	96,373	411	204	2,514,979	83,832	386	220	3,023,257	100,775
Dec.	428	253	3,083,520	99,468	418	231	2,912,527	93,952	411	229	2,956,389	95,367	386	234	3,249,057	104,808
Total			26,850,844	*73,563			40,025,850	*109,659			31,076,572	*84,908			36,370,404	*99,645
	1926				**1927**				**1928**				**1929**			
Jan.	386	225	3,319,789	107,089	369	210	3,101,346	100,043	353	184	2,855,515	92,113	328	202	3,433,028	110,742
Feb.	382	223	2,923,850	104,423	369	217	2,940,604	105,021	353	186	2,898,668	99,954	326	208	3,218,376	114,942
March	377	235	3,458,171	111,554	365	223	3,482,107	112,326	350	197	3,199,175	103,199	326	213	3,709,518	119,662
April	376	237	3,438,805	114,627	364	221	3,424,377	114,146	349	195	3,181,975	106,066	326	216	3,663,167	122,106
May	376	229	3,477,820	112,187	363	211	3,391,067	109,388	345	199	3,292,790	106,219	325	220	3,898,344	125,753
June	372	220	3,232,478	107,749	362	198	3,089,726	102,991	343	189	3,082,340	102,745	325	220	3,715,104	123,837
July	372	217	3,224,663	104,021	362	190	2,954,625	95,311	342	185	3,072,711	99,120	325	217	3,782,511	122,016
Aug.	372	215	3,200,723	103,249	362	189	2,950,674	95,183	340	183	3,136,995	101,193	325	209	3,746,198	120,845
Sept.	372	216	3,163,269	105,442	362	181	2,782,500	92,750	340	194	3,063,593	102,120	323	204	3,496,454	116,548
Oct.	374	218	3,334,206	107,555	361	174	2,812,015	90,712	338	196	3,373,539	108,824	318	203	3,588,146	115,747
Nov.	375	216	3,237,992	107,933	359	171	2,661,863	88,728	337	194	3,304,656	110,155	317	176	3,182,420	106,081
Dec.	369	203	3,089,175	99,651	354	169	2,698,208	87,039	335	198	3,369,784	108,702	316	156	2,836,917	91,513
Total			39,100,941	*107,126			36,289,112	*99,422			37,831,741	*103,365			42,270,183	*115,808
	1930				**1931**				**1932**				**1933**			
Jan.	314	173	2,838,751	91,573	309	102	1,715,443	55,337	298	61	971,437	31,336	291	45	568,785	18,348
Feb.	314	180	2,845,937	101,640	307	109	1,711,192	61,114	298	64	960,550	33,122	291	44	553,067	19,752
March	314	184	3,252,822	104,930	307	116	2,028,906	65,448	298	60	967,015	31,194	291	38	542,013	17,484
April	314	182	3,191,119	106,371	307	113	2,009,582	66,986	297	59	855,734	28,524	291	48	623,606	20,786
May	314	180	3,241,477	104,564	307	105	1,995,001	64,355	297	54	783,769	25,282	290	61	892,326	28,784
June	312	162	2,934,508	97,817	303	91	1,637,998	54,599	297	47	626,015	20,867	289	90	1,264,953	42,165
July	312	144	2,638,441	85,110	303	82	1,462,270	47,170	297	45	570,222	18,394	289	105	1,801,345	58,108
Aug.	312	137	2,525,105	81,455	303	75	1,279,205	41,264	297	41	528,105	17,035	289	98	1,833,265	59,137
Sept.	310	126	2,276,781	75,893	303	74	1,168,436	38,947	295	46	593,640	19,788	289	89	1,507,931	50,264
Oct.	310	111	2,165,374	69,851	303	69	1,172,781	37,831	292	50	644,648	20,795	289	81	1,358,540	43,824
Nov.	310	107	1,865,458	62,182	302	67	1,101,820	36,727	292	51	625,753	20,858	289	77	1,083,740	36,124
Dec.	310	95	1,665,715	53,732	301	57	980,377	31,625	291	42	547,179	17,650	289	74	1,192,136	38,456
Total			31,441,488	*86,141			18,263,011	*50,035			8,674,067	*23,699			13,221,707	*36,223
	1934				**1935**				**1936**				**1937**			
Jan.	289	86	1,225,643	39,537	281	89	1,478,443	47,692	267	118	2,029,304	65,461	243	169	3,219,741	103,863
Feb.	289	90	1,270,792	45,385	281	96	1,614,905	57,675	266	120	1,838,932	63,411	242	176	3,020,006	107,857
March	289	97	1,625,588	52,438	280	97	1,770,990	57,120	265	126	2,046,121	66,004	242	182	3,470,470	111,951
April	285	109	1,736,217	57,873	278	97	1,671,556	55,719	265	143	2,409,474	80,316	241	186	3,400,636	113,354
May	284	117	2,057,471	66,370	275	96	1,735,577	55,986	253	145	2,659,643	85,795	240	170	3,545,180	114,360
June	283	92	1,936,897	64,563	272	91	1,558,463	51,949	253	144	2,596,528	86,551	240	182	3,115,302	103,843
July	282	74	1,228,544	39,630	270	92	1,520,340	49,043	252	146	2,595,791	83,735	237	192	3,501,359	112,947
Aug.	282	61	1,060,187	34,199	270	98	1,759,782	56,767	248	148	2,711,726	87,475	237	191	3,616,954	116,676
Sept.	282	61	899,075	29,969	270	104	1,770,259	59,009	247	154	2,728,257	90,942	237	181	3,417,960	113,932
Oct.	282	65	951,353	30,689	269	116	1,978,379	63,818	245	161	2,991,794	96,509	237	151	2,891,026	93,259
Nov.	281	60	957,906	31,930	268	122	2,066,293	68,876	245	165	2,949,942	98,331	237	114	2,007,031	66,901
Dec.	281	67	1,028,006	33,161	268	120	2,115,496	68,242	245	170	3,125,192	100,813	...	...	.....	.....
Total			15,977,679	*43,774			21,040,483	*57,694			30,682,704	*83,832			†35,205,665	*105,406

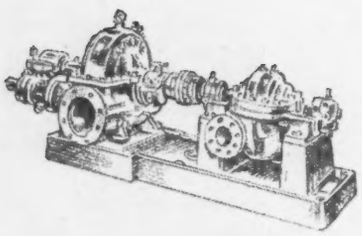
*Average †Eleven months.

an Announcement . . .

THE INTEREST which the Worthington Pump and Machinery Corporation has acquired in the Moore Steam Turbine Corporation of Wellsville, New York, adds to the list of products sponsored by Worthington, a line of steam turbine equipment second to none. We propose to provide Moore Steam Turbine Corporation with the benefit of our engineering resources, in matters pertaining both to application and metallurgy, so as to employ fully the expanded manufacturing facilities recently completed at the Moore Plant in Wellsville, New York.

It is the determination of both the Moore and the Worthington organizations to continue the steady progress of development which has characterized the policy of the Moore Steam Turbine Corporation throughout its existence. The fine reputation which Moore products enjoy in many industries, including Petroleum, Chemical, Public Utility and Shipbuilding, is based upon a standard of quality which will be maintained.

Vice-President



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All types for generator and equipment drives
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Literature on request

THE history of every company that has become associated with Worthington has been one of wider engineering understanding, expanded research facilities and access to broader markets. These associations have developed the ability of each to better serve its patrons. New friendships have been formed with the addition of each new unit . . . and more enterprises have learned to depend upon Worthington for a greater range of products.

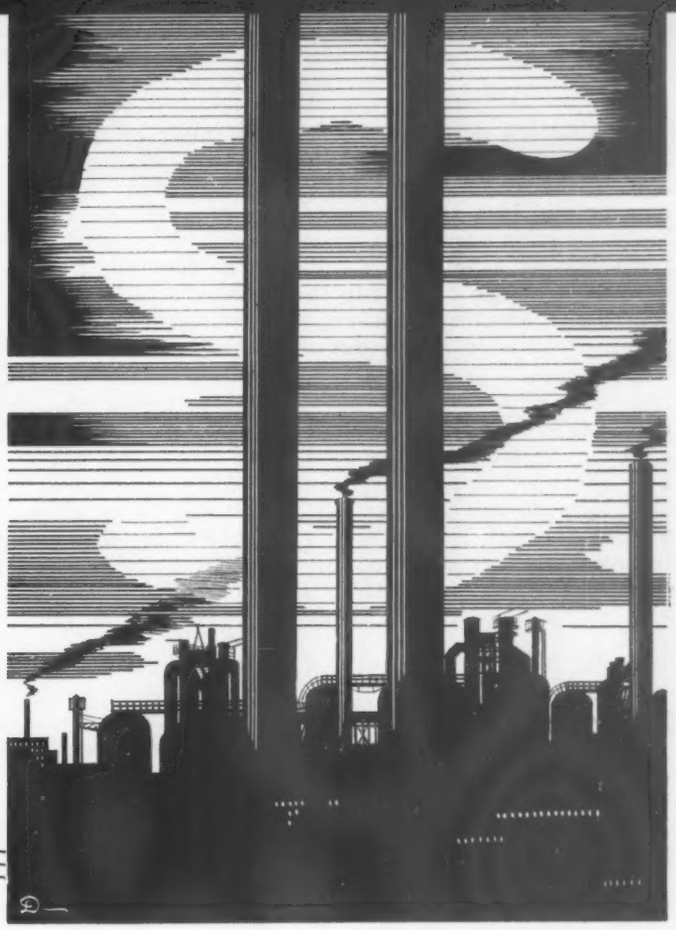
WORTHINGTON PUMP AND MACHINERY CORPORATION

General Offices: **HARRISON, NEW JERSEY** - *Branch Offices and Representatives in Principal Cities throughout the World*

WORTHINGTON

M10-1

domestic market summary



1937 Good Year in Steel Despite Unusual Handicaps; Strikes, Floods, Recession, Prevent Record

■ STEEL MADE a remarkable record in 1937 and would have set a new high mark, above that of 1929, except for circumstances entirely outside the industry. In spite of various hindrances its volume of production stands at least third in rank, with only 1929 and 1928 higher. Compared with 1936 it gained in every respect.

The history of 1937 recalls the oft-repeated observation of Andrew Carnegie, that steel is either a prince or a pauper. For the first six or seven months steel occupied its princely throne, then slipped into the usual summer lull. Resumption to a high level was expected to follow Labor day, with every indication of a record year, perhaps to eclipse 1929. But the lull developed into a tailspin that lasted through the final four months, the pauper period.

The upward surge of business characteristic of practically all 1936 continued into 1937 and brought a steady increase of production, reaching a peak at 90.5 per cent in April and remaining high through August, above 80 per cent. September output held fairly well, at slightly under 80 per cent, mill operation continuing on backlogs, in the absence of heavy buying. From September to the close of the year decline in production was precipitous, dropping from 80 per cent of capacity Sept. 18 to about 30 per cent in December. This was a drop of 50 points in about ten weeks. Probably the nearest parallel to this downward sweep was in 1934, when the rate declined from 62 per cent in June to 20 per cent in August, a loss of 42 points in about ten weeks.

With constant pressure for deliveries through first half there seemed no reason to doubt continuance of good business and as cumulative ingot production for nine months was only 2 per cent under the corresponding 1929 total a new record was regarded as almost certain, in view of the fact that fourth quarter of 1929 showed an unusually sharp decline. It was calculated that an average of 69 per cent for the remaining three months would give a figure equal to the 1929 record.

However, failure of the automotive industry to buy in the expected volume for new models and the action of other consumers in working off surplus stocks of steel accumulated in earlier months cut down sales far below expectations. For the final quarter steel production was far below consumption.

Various interruptions interfered with orderly procedure during first half and perhaps these caused some overbuying by consumers, seeking to assure themselves of sufficient supplies to meet needs. In January and again in May the Ohio river rose to flood level and caused curtailment of production along its valley. During January and February strikes among automobile workers held up deliveries of steel. In May the CIO called strikes among leading independent steelmakers in the Middle West which interfered with production for several weeks.

With steady buying at the beginning of the year,

continuing the activity of 1936, steel mills accumulated heavy backlogs by the beginning of February and on many products were sold full through first quarter and into second quarter. By the middle of February sales were being made on the basis of prices prevailing at the time of delivery, as rumors of a probable increase had begun to circulate. Position on mill books, assuring delivery, was deemed more important than price, in the face of heavy demand.

By March 1 backlogs covered delivery into April, May and June. The expected advance in prices was made March 1 on shipments to June 30. Semifinished steel was increased $3 per ton; skelp, which had not been advanced the previous fall with other semifinished steel, was increased $6 per ton; shapes and plates advanced $4, bars $5 and sheets $5 to $8, galvanized taking the higher raise because of the increased price of zinc. These prices later were reaffirmed for third and fourth quarters and finally for first quarter of 1938.

Strong Sellers' Market In More Than Half of Year

Higher prices did not stem the flood of buying and by the end of March a strong sellers' market had developed, orders being closely scrutinized and sales booked only in proportion to consumers' normal requirements. Every effort was made to avoid speculative buying. By this time deliveries had been greatly extended and in the case of some grades of sheets were at least 22 weeks deferred.

This situation was intensified in later months by interruption to production by mills involved in the CIO strikes. Up to Labor day mill backlogs were heavy and deliveries delayed. Fall buying was relied on to make its appearance before these tonnages were completed and fourth quarter was looked forward to as a comfortable period for mill and consumer. That such a situation could be reversed and business melt away so quickly was one of the phenomena of the steel industry.

By the beginning of fourth quarter it developed that inventories in hands of consumers were larger than had been estimated and a general policy of reducing stocks was adopted, with the result that mill buying was light and production gradually tapered.

1937 Steel Production Third Highest in History

Steel ingot production failed to equal the 1929 total but came within a narrow margin of the total for 1928, which was the highest of all time except for 1929. Ingot tonnage for 1937, with December estimated, was 49,620,000 gross tons; for 1929 it was 54,312,279 tons; for 1928 it was 49,865,185 tons, and for 1936 it was 46,807,780 tons.

Pig iron production for 1937, with December estimated, was 36,705,000 gross tons of coke iron. Including charcoal iron and ferroalloys made in the electric furnace the total was 37,080,000 gross tons. This compares with 30,682,704 tons for 1936. The 1937 figure has been exceeded several times in past years, when more pig iron and less scrap was used in steelmaking.

Pig iron prices were advanced $1 per ton late in February for delivery to the end of that month and a further advance was made March 1 for second quarter. These prices held through the remainder of the year, though a further advance was considered during third quarter. Rapid fall in the price of scrap prevented further rise.

Export of pig iron was a feature of foreign trade in 1937, a total of 719,666 tons being shipped abroad during the first ten months. This was 25.1 per cent of total iron and steel exports for that period. In ten months of 1936 exports of pig iron totaled only 1936 tons, constituting 0.1 per cent of total iron and steel exports. Japan and the United Kingdom were the principal buyers.

Steelmaking scrap through the year presented a situation almost parallel with the curve of buying. The composite price of steelmaking grades compiled by STEEL rose from $17.58 per gross ton at the beginning of January to $22.08 at the beginning of April, the highest point in many years, leaving only a narrow differential under the market price of basic pig iron, its competitor in the open hearth. Some steelmakers reduced the proportion of scrap in their mixtures because of the high price.

A decline started in April, reaching a composite price of $20.50 at the end of August, the downward movement accelerating sharply to $12.75 at the end of November and a slight recovery in December.

Foreign demand for steelmaking scrap was heavy throughout the year. Japan was the leading buyer but exchange difficulties prevented its buying during the later months. European countries sought supplies here and finally established a buying cartel to act for all member countries. The first purchase by this body was in June, said to have been about 200,000 tons, followed by a second purchase in September of 250,000 tons. On this the price is said to have been $21.50 per ton, $2 higher than the previous tonnage. In November between 400,000 and 500,000 tons were covered at about $16.50 per ton. Shipment on this sale was to be made over early months of 1938.

Total exports of steelmaking scrap in 1937 are estimated at almost 4,000,000 tons, the highest ever attained. In the first ten months Japan, the leading exporter, took 1,868,608 tons, nearly half the total exported.

Movement of iron ore was unusually heavy until near the close of the season of navigation and it had been expected that a new record would be set, exceeding that of 1929. However, slackening of the rate of steel production brought some curtailment in the final months and the season's total moved by lake was 62,598,836 tons, with 600,000 tons shipped all rail. The total of 63,198,836 tons compares with 44,822,023 tons in 1936 and is almost exactly 2,000,000 tons less than the 65,195,000 tons moved in 1929.

Foreign ore shipments were interfered with by the Spanish war and the Sino-Japanese trouble, resulting in higher prices for ore and higher ocean freights. By the end of the year most of the effects of these difficulties had been overcome, though in general prices of imported ore were higher. Imports of iron ore in ten months were 1,229,848 tons.

Following the trend of recent years, largest demand was for flat-rolled steel, sheets, strip and plates, while structurals, rails and other heavy sections were not as active. The lighter steels are used largely in consumer goods, automobiles, household articles, such as

refrigerators and radios, and in the rapidly growing field of air conditioning.

While much has been said of the slowness of the market for structural steel as one of the factors in holding back purchases of heavy steel products, the total for 1937 shows a slight gain over 1936. The weekly compilation by STEEL of structural awards over 100 tons for 11 months totaled 1,168,236 tons, compared with 1,069,349 tons in the same period of 1936. The American Institute of Steel Construction, reporting on jobs of all sizes, for ten months, gives shipments of 1,415,403 tons, compared with 1,292,315 tons for the like period of 1936. Its report on bookings for ten months of 1937 gives 1,381,000 tons, compared with 1,320,000 tons in ten months of 1936.

Many Large Structural Projects Let During Year

Ten projects requiring over 7000 tons of structurals each were placed during the year. The press shop for Ford Motor Co., taking 45,000 tons, was the largest letting. This was followed by 32,300 tons for the Mississippi river bridge at Baton Rouge, La.; 28,000 tons for electrification work for the Pennsylvania railroad; 26,800 tons for the Bronx-Whitestone bridge, New York; 16,000 tons for the west side elevated highway, New York; 18,230 tons for an open-hearth building for Great Lakes Steel Corp., Detroit; 10,000 tons for a federal building at Los Angeles; 9000 tons for Charity hospital, New Orleans; 8875 tons for the government printing office at Washington; 7000 tons for a bridge over the St. Lawrence river. Half a dozen projects taking 5000 tons or more were also placed.

In spite of labor troubles experienced intermittently through the year and slow sales of the final three months the automotive industry apparently exceeded all former production records with the exception of 1929. On the basis of actual figures for 11 months and an estimate for December a total of 4,917,992 cars and trucks is indicated, which exceeds the official production record of 4,616,274 for all of 1936.

Railroad Buying Hindered By Burden of Wages, Taxes

Railroads contributed less than a usual share of steel buying in 1937, unusually heavy buying of cars and rails having been done late in 1936. A wage increase at midyear added heavily to expenditures and a request for an advance in freight rates on certain commodities was pending for several months, buying being delayed while awaiting a decision. The advance produced insufficient added income to cover the wage increase and a further rate advance on all commodities was asked, buying again being delayed while this was being considered. Railroad executives in effect promised heavy buying of cars, locomotives and rails over a period of years in case the higher rates were granted.

Yet buying of cars was of fair proportions over the year as a whole. Following placing of orders for 23,450 cars in December the carriers bought 17,806 in January and followed this by fairly large lots until June. For 11 months freight car purchases were slightly over 51,000, compared with 64,643 in 1936. Car buying in 1937 was the largest since 1929, except for 1936. Rail buying was light, totaling probably not more than 200,000 tons for domestic use, with about 60,000 tons for export.

Railroads took delivery of 292 steam and 112 diesel-electric locomotives in ten months of 1937, a total of 404. This compares with a total of 139 in all of 1936 and 123 in all of 1935. At the end of October 214 locomotives were on unfilled orders.

Tin plate producers experienced one of their best years, operating most of the time at 100 per cent of capacity, with a higher rate occasionally as extra turns were worked to meet insistent demands for delivery. As early as April buyers were being apportioned tonnage and attractive export inquiries were being refused. Not until the end of the vegetable packing season, about Oct. 1, did production decline. The first week in April prices were advanced 50 cents per base box, to $5.35, Pittsburgh, this price being reaffirmed Dec. 6 to apply on 1938 business. This was the first increase since December 1933.

Inasmuch as most tonnage consumers of tin plate were covered amply to Sept. 30 at the time of the increase producers received little benefit from the higher price until fourth quarter. They were hard pressed to make delivery of all contracted tonnage by Sept. 30 but by that time practically all the low-priced material had been cleared. In November mills began advanced rollings, as stocks had been depleted by heavy shipments. Consumers had fairly good stocks in some instances. Through most of the year demand for export was heavy, prices being on the Pittsburgh parity until late in the year, when offers were at lower prices and not attractive.

Farm Orders Help Market; Ferroalloy Prices Higher

One of the steadiest consumers of steel through practically the entire year was the agricultural implement industry. With farm income at a high level and much equipment needed to replace wornout machinery farmers spent freely for implements and manufacturers operated at practical capacity to meet demand.

With steel production at a high rate ferromanganese was in strong demand during the first half and prices were advanced $15 March 1 and $7.50 April 27. These increases brought the price to $102.50, duty paid, Atlantic ports, for spot business for the remainder of second quarter. Domestic spiegeleisen was advanced $3 per ton, to $33, Palmerton, Pa., April 27. Both these prices were continued for the remainder of the year. These higher prices were caused by heavy demand for material in European steelmaking countries as well as in the United States. At one time, in fact, inquiries were current in this country for export material.

The higher prices did not apply on much tonnage as most large users contracted for sufficient tonnage before the increase to carry them through the summer. Protections to July 1 caused heavy specifications in June and shipments in July fell off sharply, only to increase somewhat in August as continued heavy steel production used up stocks. Beginning in September demand for ferroalloys decreased in proportion as steel output declined.

Statistics of production of steel ingots and pig iron for 1937 and preceding years, by months, will be found on pages 296 and 297, respectively.

AVERAGE MONTHLY QUOTATIONS IN 1937

Base or Furnace, Unless Otherwise Specified; Scrap, Delivered to Consumers

Base or Furnace, unless otherwise specified) scrap, delivered to consumers

PITTSBURGH

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Structural Shapes	2.05c	2.05c	2.20c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c
Plates	2.05	2.05	2.20	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
Bars	2.20	2.20	2.40	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45
Cold-Finished Steel Bars	2.55	2.55	2.85	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
Strip, Hot-Rolled	2.15	2.15	2.35	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
Strip, Cold-Rolled	2.85	2.85	3.15	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Standard Spikes	2.90	2.90	3.05	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15
Plain Wire	2.60	2.60	2.85	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
Structural Rivets	3.25	3.25	3.45	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
No. 24 Hot-Rolled Annealed Sheets	2.80	2.80	3.10	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15
No. 9-10 Blue Annealed Sheets	2.15	2.15	2.35	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
No. 24 Galvanized Sheets	3.40	3.40	3.70	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
Tin Plate, base box	$4.85	$4.85	$4.85	$5.25	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35
Wire Nails	2.25	2.25	2.70	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
Steel Pipe, 1 to 3-inch, % discount (base $200 per ton)	69.5%	69.5%	65.5%	64.5%	64.5%	64.5%	64.5%	64.5%	64.5%	64½%	64.5%	64.5%
Bessemer Pig Iron, Neville Island base	$21.50	$21.50	$24.10	$24.50	$24.50	$24.50	$24.50	$24.50	$24.50	$24.50	$24.50	$24.50
Basic Pig Iron, Neville Island base	20.50	20.50	23.10	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50
No. 2 Foundry Pig Iron, Neville Island Base	21.00	21.00	23.60	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
Malleable Pig Iron, Neville Island base	21.00	21.00	23.60	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
Bessemer Ferrosilicon, 10 per cent (Jackson co. base)	29.00	29.00	31.80	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00
Billets, Bessemer and Open-Hearth	34.00	34.00	36.40	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00
Sheet Bars, Bessemer and Open-Hearth	34.00	34.00	36.40	37.00	37.90	37.00	37.00	37.00	37.00	37.00	37.00	37.00
Wire Rods	43.00	43.00	46.20	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Furnace Coke, spot	4.00	4.00	4.05	4.50	4.85	4.65	4.50	4.50	4.45	4.40	4.37	4.37
Foundry Coke, spot	4.25	4.25	4.25	5.05	5.30	5.30	5.30	5.30	5.25	5.25	5.25	5.25
Heavy Melting Steel Scrap	18.95	19.65	22.40	22.75	19.55	18.40	19.40	21.85	20.40	17.15	14.10	12.75
Low Phosphorus Scrap	24.00	25.15	26.70	27.15	25.55	25.00	25.15	26.50	25.65	22.15	18.70	17.50
No. 1 Cast Scrap	17.50	18.15	19.20	19.50	18.80	18.70	18.90	20.25	19.80	17.95	16.50	16.00

CHICAGO

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
Bars	2.25c	2.25c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c
Plates	2.10	2.10	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
Structural Shapes	2.10	2.10	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
Rail Steel Bars	2.10	2.10	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35
Bar Iron*	2.15	2.15	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
No. 24 Hot-Rolled Annealed Sheets	2.90	2.90	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
*Terre Haute, Ind., base 5 cents less												
No. 2 Foundry and Malleable Pig Iron	$21.00	$21.00	$23.20	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00
Southern No. 2 Pig Iron, delivered	21.22	21.22	23.45	24.22	24.22	24.22	24.22	24.22	24.22	24.22	24.22	24.22
Lake Superior Charcoal Iron, delivered Chicago	26.54	26.54	28.95	30.04	30.04	30.04	30.04	30.04	30.04	30.04	30.14	30.24
Heavy Melting Steel Scrap	18.25	19.50	20.90	20.75	17.55	16.00	17.75	19.75	17.85	13.95	12.55	11.50
Steel Specialties, Chicago	19.65	21.00	22.35	23.75	21.35	19.50	20.20	22.25	20.50	19.35	16.75	15.50
Rails for Rolling	19.40	20.75	22.25	23.35	21.45	19.50	20.30	21.75	20.35	17.25	15.10	14.00
Car Wheels, Iron	18.65	19.50	20.50	21.60	19.95	19.35	19.00	20.75	19.50	17.35	15.60	14.50
No. 1 Machinery Cast Scrap	15.50	16.55	17.65	17.75	15.65	15.00	15.00	16.75	14.75	13.75	12.60	12.25

EASTERN PENNSYLVANIA

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tank Plates, delivered Philadelphia	2.24c	2.24c	2.44c	2.44c	2.44c	2.44c	2.44c	2.44c	2.44c	2.44c	2.44c	2.44c
Structural Shapes, delivered Philadelphia	2.26	2.26	2.46	1.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
Bars, delivered Philadelphia	2.49	2.49	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74
Bar Iron, common, delivered Philadelphia	2.39	2.39	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64
No. 10 Blue Annealed Sheets, delivered Philadelphia	2.44	2.44	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69
Basic Pig Iron, delivered	$22.26	$22.51	$24.76	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26
No. 2X Foundry Pig Iron, delivered Philadelphia	23.14	23.39	25.64	26.14	26.14	26.14	26.14	26.14	26.14	26.14	26.14	26.14
Standard Low Phosphorus Pig Iron, delivered	25.50	25.75	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50
No. 1 Heavy Melting Steel Scrap	17.50	18.75	19.75	20.44	18.40	17.03	18.40	19.75	19.22	16.55	14.00	14.00
No. 1 Railroad Wrought Scrap	17.90	19.00	20.63	20.31	19.30	18.12	19.20	20.50	21.13	17.80	15.75	15.50
No. 1 Cupola Cast Scrap	18.85	19.00	20.69	22.50	20.35	18.81	19.55	21.25	20.50	18.95	16.75	16.25

COAL TAR PRODUCTS

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Benzol, per gallon producers' plants, tank lots	16.00c	16.00c	16.00c	16.00c	16.00c	16.00c	16.00c	16.00c	16.00c	16.00c	16.00c	16.00c
Toluol, per gallon producers' plants, tank lots	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Solvent naphtha, per gallon producers' plants tank lots	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Phenol, per pound, producers' plants, in 200-lb. drums	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Napthalene flakes, per pound, producers' plants	15.50	15.25	15.00	14.875	14.75	14.75	14.75	14.75	15.00	16.25	16.25	16.25
*Napthalene balls, per pound, producers' plants	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
Sulphate of Ammonia, per 100 lbs. Atlantic seaboard	$1.30	$1.35	$1.35	$1.35	$1.35	$1.425	$1.425	$1.425	$1.425	$1.425	$1.45	$1.45
*Western prices one-half cent higher.												

NONFERROUS METALS

Prompt, wholesale prices in cents per pound

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tin, Straits, spot, New York	50.917	51.935	63.059	59.149	55.600	55.884	59.120	59.423	58.654	51.630	43.568	44.625
Copper, electro, delivered Connecticut	12.660	13.705	16.000	15.365	14.000	14.000	14.000	14.000	13.780	12.087	11.050	10.497
Zinc, prime western, East St. Louis	5.850	6.458	7.381	7.019	6.750	6.750	6.923	7.212	7.190	6.095	5.640	5.089
Lead, open market, East St. Louis	5.850	6.089	7.046	6.034	5.850	5.850	5.850	6.302	6.250	5.590	4.900	4.850
Lead, open market, New York	6.000	6.239	7.196	6.184	6.000	6.000	6.000	6.452	6.400	5.740	5.050	5.000
Aluminum	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000
Antimony, American, spot, New York	14.130	14.494	16.375	16.043	14.820	14.702	14.803	15.327	16.555	16.935	15.920	14.368
Nickel, cathodes	35.000	35.000	35.000	35.000	35.000	35.000	35.000	35.000	35.000	35.000	35.000	35.000

MONTHLY PRICE AVERAGES FOR TEN YEARS

Price Averages for Years Prior to 1928 May Be Found in STEEL for January 7, 1935

Ores and Alloys

Per Gross Ton

Iron Ore Prices at Date of Buying Movement, Delivered Lower Lake Ports

Season	Date buying movement	Old range Bessemer Ton	Old range Bessemer Cents per unit	Old range Nonbessemer Ton	Old range Nonbessemer Cents per unit	Mesabi Bessemer Ton	Mesabi Bessemer Cents per unit	Mesabi Nonbessemer Ton	Mesabi Nonbessemer Cents per unit	Iron prices, Valley Bessemer	Iron prices, Valley No. 2 Foundry
1937	Mar. 12, 1937	$5.25	10.194	$5.10	9.903	$5.10	9.903	$4.95	9.612	$24.50	$24.00
1936	Apr. 3, 1936	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	20.00	19.50
1935	May 4, 1935	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	19.00	18.50
1934	May 19, 1934	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	19.00	18.50
1933	June 12, 1933	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	16.00	15.50
1932	June 3, 1932	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	14.50	14.50
1931	Apr. 15, 1931	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	17.00	17.00
1930	Apr. 1, 1930	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	19.00	18.50
1929	Mar. 22, 1929	4.80	9.320	4.65	9.029	4.65	9.029	4.50	8.738	18.50	18.00
1928	Apr. 16, 1928	4.55	8.835	4.40	8.544	4.40	8.544	4.25	8.252	17.50	17.25

Manganese Ore

Dollars Per Gross Ton, Duty Paid, Northern Atlantic Ports, on Basis of 50 Per Cent Ore

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$21.10	$22.60	$22.85	$27.60	$27.60	$27.85	$31.85	$31.85	$31.85	$30.60	$28.60	$28.10
1936*	18.60	18.60	18.60	18.60	18.60	18.60	18.60	18.60	18.60	19.10	19.10	20.60
1935	23.70	23.70	23.70	23.70	23.70	23.70	23.70	23.70	23.70	23.70	23.70	23.70
1934	21.70	22.70	22.70	22.70	22.70	22.70	22.70	22.70	23.20	23.70	23.70	23.70
1933	19.95	19.95	19.95	19.95	19.95	20.20	20.45	21.45	21.45	21.70	21.70	21.70
1932	22.70	22.70	22.70	22.70	21.70	21.70	21.70	21.70	21.20	21.20	21.20	20.70
1931	24.20	24.20	23.70	23.70	23.70	23.70	23.70	23.70	23.70	22.70	22.70	22.70
1930	29.95	24.70	24.70	24.70	24.70	24.70	24.70	24.20	24.20	24.20	24.20	24.20
1929	27.70	27.70	27.70	27.70	27.70	27.70	26.70	26.70	26.70	25.70	25.70	25.70
1928	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	29.20	29.20

*Effective Jan. 1, duty ½c per pound metallic content; $5.60 gross ton on 50 per cent ore.

Bessemer Ferrosilicon, 10 Per Cent

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$29.00	$29.00	$31.80	$33.00	$33.00	$33.00	$33.00	$33.00	$33.00	$33.00	$33.00	$33.00
1936	27.75	27.75	27.75	27.75	27.75	27.75	27.75	27.75	27.75	27.75	27.75	29.00
1935	27.75	27.75	27.75	27.75	27.75	27.75	27.75	27.75	27.75	27.75	27.75	27.75
1934	27.25	27.25	27.25	27.25	27.75	27.75	27.75	27.75	27.75	27.75	27.75	27.75
1933	20.50	20.50	20.50	20.50	20.50	20.75	22.40	24.65	27.00	27.75	27.75	27.75
1932	23.00	22.00	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50
1931	25.00	25.00	25.00	25.00	25.00	25.00	25.00	24.00	23.00	23.00	23.00	23.00
1930	30.00	30.00	30.00	30.00	30.00	29.50	29.00	29.00	25.00	25.00	25.00	25.00
1929	31.00	31.00	31.00	31.00	31.00	31.00	31.00	30.20	30.00	30.00	30.00	30.00
1928	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00

Ferrosilicon, 50 Per Cent

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$69.50	$69.50	$69.50	$69.50	$69.50	$69.50	$69.50	$69.50	$69.50	$69.50	$69.50	$69.50
1936	77.50	77.50	77.50	77.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50
1935	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50
1934	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50
1933	74.50	74.50	74.50	74.50	74.50	74.50	74.50	74.50	74.50	74.50	74.50	74.50
1932	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	77.50	76.30
1931	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	77.50
1930	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50
1929	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50
1928	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50

Spiegeleisen, 20 Per Cent

At Producers' Furnaces

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$26.00	$26.00	$28.00	$30.00	$33.00	$33.00	$33.00	$33.00	$33.00	$33.00	$33.00	$33.00
1936	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1935	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1934	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1933	24.00	24.00	24.00	24.00	24.00	24.00	27.00	27.00	27.00	27.00	27.00	27.00
1932	27.00	27.00	27.00	27.00	27.00	26.50	25.00	25.00	25.00	25.00	24.25	24.00
1931	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	27.00
1930	34.00	34.00	34.00	34.00	34.00	34.00	33.00	33.00	33.00	33.00	33.00	30.00
1929	34.00	34.00	34.00	34.00	34.00	34.00	34.00	33.20	33.50	34.00	34.00	34.00
1928	32.00	32.00	32.00	32.00	32.00	32.00	33.00	33.00	33.00	33.00	33.00	34.00

Ferromanganese, 80 Per Cent, del. Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$84.79	$84.79	$92.29	$99.79	$107.29	$107.29	$107.29	$107.29	$107.29	$107.29	$107.39	$107.49
1936	90.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	80.13	82.65
1935	89.79	89.79	89.79	89.85	90.13	90.13	90.13	90.13	90.13	90.13	90.13	90.13
1934	90.24	90.24	90.24	90.24	90.24	90.00	89.79	89.79	89.79	89.79	89.79	89.79
1933	73.24	73.24	73.24	73.24	73.24	73.24	84.44	87.24	87.24	87.24	87.24	87.24
1932	79.85	80.24	20.24	80.24	80.24	74.99	73.24	73.24	73.24	73.24	73.24	73.24
1931	89.79	89.79	89.79	89.79	89.79	89.79	89.79	89.79	89.79	89.79	89.79	79.79
1930	104.79	103.79	103.79	103.79	103.79	103.79	103.79	103.79	103.79	103.79	103.79	93.25
1929	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	109.79	104.79
1928	104.79	104.79	104.79	104.79	108.19	109.79	109.79	109.79	109.79	109.79	109.79	109.79

Duty of 1¾ cents per pound contained manganese became effective on ferromanganese Sept. 21, 1922.

Ferrotungsten

Per Pound of Metallic Tungsten Contained

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$1.35	$1.35	$1.40	$1.75	$1.82	$1.82	$1.82	.....	.....	$2.95	$2.25	$1.85
1936	1.35	1.35	1.35	1.35	1.35	1.35	1.30	1.30	1.30	1.30	1.30	1.30
1935	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
1934	1.16	1.16	1.16	1.20	1.35	1.45	1.35	1.35	1.35	1.35	1.35	1.35
1933	0.94	0.94	0.94	0.94	0.94	0.94	0.96	1.04	1.02	1.10	1.16	1.16
1932	1.10	1.10	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
1931	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
1930	1.45	1.45	1.43	1.40	1.35	1.20	1.20	1.10	1.11	1.11	1.12	1.13
1929	1.04	1.04	1.09	1.30	1.32	1.36	1.38	1.43	1.45	1.45	1.45	1.47
1928	0.94	0.93	0.93	0'93	0.95	0.96	0.97	0.97	0.97	0.97	0.98	1.00

Ferrochrome, 66-70 Per Cent

Per Pound of Metallic Chromium Contained

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$10.00	$10.00	$10.25	$10.50	$10.50	$10.50	$10.50	$10.50	$10.50	$10.50	$10.50	$10.50
1936	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
1935	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
1934	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
1933	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.60
1932	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	9.90
1931	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	10.25
1930	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1929	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1928	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00

Pig Iron

Per Gross Ton

Basic, Valley

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$20.50	$20.50	$23.10	$23.50	$23.50	$23.50	$23.50	$23.50	$23.50	$23.50	$23.50	$23.50
1936	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.25	20.00
1935	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	19.00	19.00
1934	17.00	17.00	17.00	17.60	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
1933	14.00	14.00	14.00	14.00	14.40	15.00	15.60	16.00	17.00	17.00	17.00	17.00
1932	15.00	15.00	15.00	15.00	15.00	14.50	14.00	14.00	14.00	14.00	14.00	14.00
1931	17.00	16.75	16.75	17.00	17.00	17.00	17.00	17.00	17.00	16.60	15.00	15.00
1930	18.50	18.50	18.50	18.50	18.50	18.50	18.25	18.00	17.75	17.00	17.00	17.00
1929	17.50	17.50	17.60	18.00	18.30	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1928	17.00	17.00	17.00	16.75	16.20	15.80	15.95	16.00	16.10	16.85	17.70	17.50

Bessemer, delivered Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$22.31	$22.30	$24.85	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26
1936	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	21.06	21.81
1935	19.76	19.76	19.76	19.76	19.80	19.81	19.81	19.81	19.81	19.81	20.81	20.81
1934	19.26	19.26	19.26	19.56	19.76	19.76	19.76	19.76	19.76	19.76	19.76	19.76
1933	15.76	15.76	15.76	16.26	16.66	17.26	17.86	18.26	19.26	19.26	19.26	19.26
1932	17.26	16.96	16.76	16.76	16.15	15.95	15.76	15.76	15.76	15.76	15.76	15.76
1931	18.76	18.51	18.26	18.26	18.26	18.26	18.26	18.26	18.26	18.16	17.76	15.71
1930	20.76	20.76	20.76	20.76	20.76	20.76	20.46	20.26	24.13	19.36	18.63	18.76
1929	19.96	19.86	20.11	20.26	20.56	20.76	20.76	20.76	20.76	20.76	20.76	20.76
1928	19.26	19.26	19.21	19.26	19.26	18.76	18.76	18.76	18.86	19.11	19.96	20.01

No. 2 Foundry, f.o.b. Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$21.00	$21.00	$23.20	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00
1936	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.75	20.50
1935	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.75	19.50	19.50
1934	17.50	17.50	17.50	18.25	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1933	15.50	15.50	15.50	15.50	15.90	16.00	16.75	17.00	17.50	17.50	17.50	17.50
1932	16.50	16.50	16.50	16.00	15.60	16.00	15.50	15.50	15.50	15.50	15.50	15.50
1931	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.20	17.00	16.60
1930	20.00	20.00	19.50	19.40	19.00	18.40	17.90	17.50	17.50	17.50	17.50	17.50
1929	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
1928	18.50	18.50	18.50	18.50	18.20	18.00	17.60	17.60	18.25	18.80	20.00	20.00

No. 2 Foundry, f.o.b. Valley

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$21.00	$21.00	$23.60	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00
1936	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.75	20.50
1935	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	19.50	19.50
1934	17.50	17.50	17.50	18.25	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1933	14.50	14.50	14.50	14.50	14.75	15.50	16.10	16.50	17.50	17.50	17.50	17.50
1932	15.50	15.50	15.00	15.00	14.80	14.50	14.50	14.50	14.50	14.50	14.50	14.50
1931	17.00	16.75	16.90	17.00	17.00	17.00	17.00	17.00	17.00	16.85	16.00	15.50
1930	18.50	18.50	18.50	18.50	18.50	17.63	18.00	18.00	17.75	17.20	17.00	17.00
1929	17.50	17.50	17.75	18.15	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1928	17.25	17.25	17.25	17.25	17.10	16.75	16.50	16.50	16.85	17.00	17.70	18.00

No. 2X Foundry, delivered Philadelphia

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
1937	$23.14	$23.39	$25.64	$26.14	$26.14	$26.14	$26.14	$26.14	$26.14	$26.14	$26.14	$26.14
1936	21.68	21.68	21.68	21.68	21.68	21.68	21.68	21.68	21.68	21.68	21.93	22.68
1935	20.63	20.63	20.63	20.63	20.68	20.68	20.68	20.68	20.68	20.68	21.68	21.68
1934	19.63	19.63	19.63	20.38	20.63	20.63	20.63	20.63	20.63	20.63	20.63	20.63
1933	13.76	13.76	13.76	14.51	15.91	16.76	17.28	17.88	18.63	18.63	18.63	19.63
1932	15.76	15.76	15.76	15.66	15.13	14.76	14.76	14.51	14.26	14.16	13.95	13.88
1931	18.26	18.26	18.26	18.26	17.76	17.76	17.76	17.51	17.01	16.01	16.01	15.76
1930	21.56	21.26	20.76	20.76	20.26	20.26	20.26	19.76	19.76	19.26	19.13	18.26
1929	22.26	22.01	22.26	22.26	22.76	22.76	22.76	22 26	22.26	22.26	22.26	21.76
1928	20.51	20.91	21.26	21.26	21.26	21.26	20.76	20.76	21.01	21.76	21.51	21.76

No. 2X Foundry, f.o.b. Buffalo

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$21.00	$21.25	$23.50	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00
1936	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.75	19.75
1935	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	19.50	19.50
1934	17.50	17.50	17.50	18.25	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1933	16.50	16.50	16.50	16.50	16.50	16.50	17.10	17.75	17.50	17.50	17.50	17.50
1932	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50
1931	18.00	18.00	18.00	18.00	17.60	17.50	17.50	17.50	17.50	17.50	17.50	17.50
1930	19.40	19.00	19.00	19.00	19.00	19.00	19.00	18.75	19.00	18.40	18.00	18.00
1929	19.00	19.00	19.25	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
1928	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	18.00	19.00	19.00

Southern No. 2, f.o.b. Birmingham

Local Delivery

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$17.38	$17.63	$19.88	$20.38	$20.38	$20.38	$20.38	$20.38	$20.38	$20.38	$20.38	$20.38
1936	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.84	15.75
1935	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.75	15.50
1934	13.50	13.50	13.50	14.25	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50
1933	11.00	11.00	11.00	11.40	12.00	12.00	12.60	13.00	13.50	13.50	13.50	13.50
1932	12.00	11.20	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1931	14.00	13.00	13.00	13.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
1930	14.70	15.00	14.50	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
1929	16.50	16.50	16.00	15.50	15.50	15.25	14.00	14.00	14.00	14.00	14.00	14.00
1928	16.00	16.00	16.00	16.00	16.00	15.90	15.50	15.65	16.25	16.25	16.30	16.50

Malleable, f.o.b. Valley

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$21.00	$21.00	$23.60	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00
1936	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.75	20.50
1935	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	19.50	19.50
1934	17.50	17.50	17.50	18.10	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1933	14.50	14.50	14.50	14.50	14.90	15.50	16.10	16.50	17.50	17.50	17.50	17.50
1932	16.00	15.50	15.50	15.50	15.00	14.50	14.50	14.50	14.50	14.50	14.50	14.50
1931	17.50	17.25	17.00	17.00	17.00	17.00	17.00	17.00	17.00	16.90	16.50	16.00
1930	19.00	19.00	19.00	19.00	19.00	19.00	18.75	18.50	18.35	17.80	17.50	17.50
1929	18.00	18.00	18.10	18.50	18.80	19.00	19.00	19.00	19.00	19.00	19.00	19.00
1928	17.25	17.25	17.25	17.25	17.25	17.00	17.00	17.00	17.10	17.35	17.90	18.00

Malleable, f.o.b. Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$21.00	$21.00	$23.20	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00	$24.00
1936	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.75	20.50
1935	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.75	19.50	19.50
1934	17.50	17.50	17.50	18.10	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50
1933	15.50	15.50	15.50	15.50	15.50	16.00	16.50	17.00	17.50	17.50	17.50	17.50
1932	16.50	16.50	16.50	16.00	16.60	16.00	15.50	15.50	15.50	15.50	15.50	15.50
1931	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.10	17.00	16.60
1930	20.00	20.00	19.50	19.40	19.00	18.40	17,90	17.50	17.50	17.50	17.50	17.00
1929	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
1928	18.50	18.50	18.50	18.50	18.20	18.00	17.60	17.60	18.25	18.80	20.00	20.00

Basic, delivered Eastern Pennsylvania

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$22.26	$22.51	$24.76	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26	$25.26
1936	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81	21.06	21.81
1935	19.76	19.76	19.76	19.76	19.81	19.81	19.81	19.81	19.81	19.81	20.81	20.81
1934	18.76	18.76	18.76	19.51	19.76	19.76	19.76	19.76	19.76	19.76	19.76	19.76
1933	13.50	13.50	13.50	14.19	15.99	18.19	16.79	17.20	17.76	17.76	17.76	18.76
1932	16.00	15.75	15.75	15.00	15.00	14.50	14.35	13.90	13.75	13.60	13.50	13.50
1931	17.25	17.25	17.25	17.25	17.00	17.00	16.75	16.75	16.00	16.00	16.00	16.00
1930	19.20	19.00	18.80	18.76	18.75	18.75	18.00	18.00	17.87	17.50	17.50	17.50
1929	20.15	20.50	20.25	20.25	20.50	20.25	19.85	19.85	19.85	19.75	19.75	19.75
1928	19.50	19.50	19.50	19.25	19.10	19.10	19.00	19.00	19.00	19.75	19.75	19.75

Standard Low Phosphorus, delivered Eastern Pennsylvania

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$25.50	$25.75	$28.50	$28.50	$28.50	$28.50	$28.50	$28.50	$28.50	$28.50	$28.50	$28.50
1936	25.13	25.13	25.13	24.13	25.13	25.13	25.13	25.13	25.13	25.13	25.38	26.13
1935	24.63	24.63	24.63	24.63	24.68	24.68	24.68	24.68	24.68	24.68	24.68	24.68
1934	24.13	24.13	24.13	24.13	24.63	24.63	24.63	24.63	24.63	24.63	24.63	24.63
1933	20.75	20.50	20.50	20.50	21.68	22.00	22.80	23.50	23.13	23.13	23.13	24.13
1932	23.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76
1931	24.76	24.76	24.76	24.76	24.76	23.76	23.76	23.76	23.76	23.76	23.76	23.76
1930	24.76	24.76	24.76	24.76	24.76	24.26	24.26	24.26	24.76	24.76	24.76	24.76
1929	24.26	24.26	24.26	24.26	24.26	24.26	24.26	24.26	24.76	24.76	24.76	24.76
1928	24.76	24.76	24.76	24.76	24.76	24.51	24.51	24.51	24.26	24.26	24.26	24.26

No. 2X, f.o.b. Virginia Furnace

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1933	$17.75	$17.75	$17.75	$17.75	$17.75	$17.75	$17.75	Not offered after July				
1932	18.00	18.00	18.00	18.00	18.00	18.00	18.00	$17.75	$17.75	$17.75	$17.75	$17.75
1931	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18.00	18.00	18.00
1930	18.25	18.25	18.25	18.25	18.25	18 25	18.25	18.25	18.25	18.25	18.25	18.25
1929	21.25	21.25	21.00	20.75	20.75	20.00	20.00	20.00	20.00	19.65	18.25	18.25
1928	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	21.25
1927	21.75	22.00	22.00	22.00	22.00	22.00	22.00	21.50	21.50	21.50	21.25	21.00

Lake Superior Charcoal, delivered Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$26.54	$26.54	$28.95	$30.04	$30.04	$30.04	$30.04	$30.04	$30.04	$30.04	$30.14	$30.24
1936	25.25	25.25	25.25	25.25	25.25	25.25	25.25	25.25	25.25	25.25	25.50	26.25
1935	24.04	24.04	24.04	24.15	24.25	24.25	24.25	24.25	24.25	24.90	25.25	25.25
1934	23.54	23.54	23.54	23.66	24.04	24.04	24.04	24.04	24.04	24.04	24.04	24.04
1933	23.04	23.04	23.04	23.06	23.04	23.04	23.04	23.04	23.54	23.54	23.54	23.54
1932	22.29	23.04	23.04	23.04	23.04	23.04	23.04	23.04	23.04	23.04	23.04	23.04
1931	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	25.54	25.04	25.04	20.79
1930	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04
1929	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04
1928	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04

Semifinished Material

Per Gross Ton f. o. b.

Bessemer Billets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$34.00	$34.00	$36.40	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00
1936	29.00	29.00	28.40	28.00	28.00	28.00	30.00	30.00	30.00	32.00	32.00	32.00
1935	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	28.50	29.00
1934	26.00	26.00	26.00	27.80	29.00	29.00	27.40	27.00	27.00	27.00	27.00	27.00
1933	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1932	27.50	27.00	27.00	27.00	27.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1931	30.00	30.00	30.00	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00
1930	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
1929	33.00	34.25	34.00	34.50	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928	33.00	33.00	33.00	33.00	33.00	32.50	32.25	32.00	32.00	32.75	33.00	33.00

Open-Hearth Billets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$34.00	$34.00	$36.40	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00
1936	29.00	29.00	28.40	28.00	28.00	28.00	30.00	30.00	30.00	32.00	32.00	32.00
1935	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	28.50	29.00
1934	26.00	26.00	26.00	27.80	29.00	29.00	27.40	27.00	27.00	27.00	27.00	27.00
1933	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1932	27.50	27.00	27.00	27.00	27.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1931	30.00	30.00	30.00	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00
1930	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
1929	33.00	34.25	34.00	34.50	36.00	36.75	35.00	35.00	35.00	35.00	35.00	34.75
1928	33.00	33.00	33.00	33.00	33.00	32.50	32.25	32.00	32.00	32.75	33.00	33.00

Open-Hearth Sheet Bars, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$34.00	$34.00	$36.40	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00
1936	30.00	30.00	28.50	28.00	28.00	28.00	30.00	30.00	30.00	32.00	32.00	32.00
1935	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	29.50	30.00
1934	26.00	26.00	26.00	28.40	30.00	30.00	28.40	28.00	28.00	28.00	28.00	28.00
1933	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1932	27.50	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1931	30.00	30.00	30.00	30.00	29.75	29.00	29.00	29.00	29.00	29.00	29.00	28.50
1930	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
1929	34.00	33.25	35.00	35.25	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928	34.00	34.00	33.70	34.00	34.00	33.50	32.25	32.20	33.00	33.00	33.60	34.00

Bessemer Sheet Bars, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$34.00	$34.00	$36.40	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00
1936	30.00	30.00	28.50	28.00	28.00	28.00	30.00	30.00	30.00	32.00	32.00	32.00
1935	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	29.50	30.00
1934	26.00	26.00	26.00	28.40	30.00	30.00	28.40	28.00	28.00	28.00	28.00	28.00
1933	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1932	27.50	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
1931	30.00	30.00	30.00	30.00	29.75	29.00	29.00	29.00	29.00	29.00	29.00	29.00
1930	33.80	33.00	33.00	33.00	32.20	31.25	31.00	31.00	31.00	31.00	31.00	30.50
1929	34.00	33.25	35.00	35.25	36.00	35.75	35.00	35.00	35.00	35.00	35.00	34.75
1928	34.00	34.00	33.70	34.00	34.00	33.50	32.25	32.20	33.00	33.00	33.60	34.00

Wire Rods, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$43.00	$43.00	$46.20	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00
1936	40.00	40.00	40.00	40.00	40.00	38.80	38.00	38.00	38.00	40.00	40.00	40.00
1935	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.50	40.00
1934	36.00	36.00	36.00	37.20	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
1933	36.20	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	36.00
1932	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00
1931	35.00	35.00	36.00	36.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1930	40.00	40.00	38.00	38.00	36.40	36.00	36.00	36.00	36.00	36.00	36.00	35.50
1929	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	40.00	40.00
1928	41.50	43.50	44.00	44.00	44.00	44.00	42.00	42.00	42.00	42.00	42.00	42.00

By-Product Foundry Coke

Per Net Ton

Birmingham, ovens

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$6.50	$6.50	$6.50	$6.95	$7.25	$7.25	$7.25	$7.25	$7.30	$7.50	$7.50	$7.50
1936	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
1935	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1934	5.00	5.00	5.00	5.40	5.50	5.70	6.00	6.00	6.00	6.00	6.00	6.00
1933	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.40	4.50	4.75	4.85	4.85
1932	4.50	4.50	4.50	4.50	4.50	4.50	4.25	4.50	4.50	4.50	4.15	4.00
1931	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.75
1930	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1929	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1928	5.00	5.00	5.00	3.95	4.80	5.00	5.00	5.00	5.00	5.00	5.00	5.00

Chicago, ovens

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$10.25	$10.25	$10.25	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00
1936	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75
1935	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	9.00	9.00	9.00
1934	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
1933	7.00	7.00	7.00	7.00	7.00	7.15	7.50	7.50	8.00	8.00	8.00	8.00
1932	7.50	7.50	7.50	7.50	7.30	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1931	8.00	8.00	8.00	8.00	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50
1930	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
1929	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
1928	9.00	9.00	9.00	9.00	9.00	8.50	8.00	8.00	8.00	8.00	8.00	8.00

Newark, delivered

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$10.17	$10.17	$10.17	$10.85	$10.85	$10.85	$10.85	$10.85	$10.85	$10.85	$10.85	$10.88
1936	9.70	9.70	9.70	9.70	9.70	9.70	9.70	9.70	9.70	10.20	10.20	10.20
1935	8.83	9.20	9.20	9.20	9.20	9.20	9.20	9.20	9.20	9.20	9.20	9.20
1934	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71
1933	8.21	8.21	8.21	8.21	8.21	8.21	8.21	8.21	8.51	8.71	8.71	8.71
1932	8.76	8.76	8.76	8.76	8.23	8.21	8.21	8.21	8.21	8.21	8.21	8.21
1931	9.00	9.00	9.00	9.00	9.00	8.70	8.70	8.70	8.70	8.70	8.70	8.70
1930	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1929	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1928	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00

St. Louis, delivered

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$10.10	$10.50	$10.50	$10.80	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00
1936	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
1935	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.80	10.00	10.00
1934	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25	9.25
1933	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	8.15	8.50	8.75	9.00
1932	8.50	8.50	8.50	8.50	8.50	7.95	7.75	7.75	7.75	7.75	7.75	7.75
1931	9.00	9.00	9.00	9.00	9.00	8.60	8.50	8.50	8.50	8.50	8.50	8.50
1930	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1929	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1928	9.75	9.75	9.75	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00

New England, delivered

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$12.00	$12.00	$12.00	$15.50	$12.50	$12.50	$12.50	$12.50	$12.50	$12.50	$12.50	$12.50
1936	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.75	11.75	12.00
1935	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.40	11.50	11.50
1934	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.87	11.00
1933	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.30	10.50	10.50	10.50
1932	10.50	10.50	10.50	10.50	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
1931	11.00	11.00	11.00	11.00	11.00	10.50	10.50	10.50	10.50	10.50	10.50	10.50
1930	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1929	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1928	11.50	11.50	11.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00

Beehive Coke

Net Ton

Foundry, Spot, Connellsville

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$4.25	$4.25	$4.25	$5.05	$5.30	$5.30	$5.30	$5.30	$5.30	$5.30	$5.30	$5.30
1936	4.00	4.20	4.10	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
1935	4.60	4.60	4.60	4.60	4.60	4.60	4.25	4.00	4.00	4.35	4.35	4.25
1934	4.25	4.25	4.25	4.55	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60
1933	2.50	2.50	2.25	2.25	2.25	2.40	2.80	3.10	3.15	3.85	4.25	4.25
1932	3.25	3.25	3.25	3.25	3.15	3.00	3.00	2.90	2.75	2.75	2.65	2.50
1931	3.30	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1930	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1929	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.55	3.50
1928	3.75	3.75	3.75	3.65	3.55	3.50	3.50	3.75	3.75	3.75	3.75	3.75

Furnace, Spot, Connellsville

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$4.00	$4.00	$4.05	$4.50	$4.85	$4.65	$4.50	$4.50	$4.45	$4.40	$4.37	$4.37
1936	3.50	3.50	3.50	3.50	3.50	3.50	3.45	3.45	3.90	4.00	4.00	4.00
1935	3.60	3.60	3.60	3.60	3.60	3.50	3.30	3.25	3.25	3.55	3.55	3.65
1934	3.60	3.50	3.35	3.30	3.45	3.60	3.60	3.60	3.60	3.60	3.60	3.60
1933	1.75	1.75	1.75	1.75	1.75	1.80	2.40	2.75	2.50	3.25	3.75	3.75
1932	2.25	2.25	2.25	2.25	2.15	2.00	2.00	2.00	2.00	2.00	1.80	1.80
1931	2.50	2.50	2.50	2.50	2.45	2.40	2.40	2.40	2.40	2.40	2.35	2.30
1930	3.55	2.60	2.60	2.60	2.55	2.50	2.50	2.50	2.60	2.60	2.55	2.50
1929	2.75	2.90	2.95	2.75	2.75	2.75	2.75	2.75	2.65	2.65	2.65	2.65
1928	2.70	2.65	2.60	2.60	2.55	2.60	2.60	2.75	2.75	2.80	2.75	2.75

Iron and Steel Scrap

Per Gross Ton Delivered

Heavy Melting Steel, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$18.95	$19.65	$22.40	$22.75	$19.00	$18.40	$19.40	$21.85	$20.40	$17.15	$14.10	$12.75
1936	14.50	14.80	15.75	15.75	14.75	13.80	14.15	16.00	17.75	18.15	17.25	18.50
1935	13.50	13.25	12.40	11.70	12.00	12.25	12.30	13.25	13.45	13.65	13.65	14.05
1934	13.05	13.90	14.35	14.15	12.80	11.90	12.00	11.45	10.75	10.50	11.15	12.95
1933	8.35	8.25	8.75	9.90	11.65	11.65	12.70	13.75	13.00	12.45	11.65	11.50
1932	10.25	10.25	10.25	10.20	9.75	9.00	8.35	8.55	9.50	9.50	9.15	8.75
1931	13.00	12.75	12.90	12.50	11.25	10.30	10.50	10.70	10.80	10.45	10.25	10.25
1930	16.55	16.90	16.60	16.05	15.40	15.10	14.90	15.20	15.70	14.80	12.85	12.75
1929	19.00	18.60	18.50	18.60	17.85	18.30	18.45	18.90	18.45	17.30	16.30	15.10
1928	15.35	15.05	14.75	14.85	15.00	14.70	14.10	15.00	16.55	17.35	17.35	17.50

Heavy Melting Steel, Detroit (dealers)

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$15.25	$15.75	$17.70	$17.70	$15.60	$14.60	$15.85	$17.25	$16.50	$13.05	$10.05	$9.00
1936	10.00	11.30	12.10	11.45	10.45	10.00	10.90	12.50	14.00	14.75	13.65	13.75
1935	9.50	9.75	7.90	7.50	7.60	8.40	8.40	9.30	9.50	9.50	9.50	9.75
1934	8.75	9.50	10.15	9.70	8.90	8.00	8.00	7.80	7.75	7.50	8.00	8.80
1933	4.50	4.50	4.50	5.40	7.75	7.80	8.95	9.50	8.55	7.35	7.00	7.25
1932	5.55	5.75	5.75	5.70	5.10	4.75	3.90	4.25	5.55	5.75	5.30	4.60
1931	9.50	9.50	9.15	8.65	8.15	7.40	7.55	7.30	6.80	6.15	6.00	5.80
1930	12.25	12.00	11.85	11.70	11.30	11.00	10.85	10.95	11.15	10.95	9.95	9.55
1929	14.20	14.35	14.05	14.25	13.90	13.50	13.75	14.35	14.20	13.40	12.40	12.50
1928	11.44	11.25	11.05	10.75	11.00	10.88	10.38	10.50	11.69	12.50	13.30	13.50

Heavy Melting Steel, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$18.25	$19.50	$20.90	$20.75	$17.55	$16.00	$17.75	$19.75	$17.85	$13.95	$12.55	$11.50
1936	13.40	14.30	14.75	14.35	13.05	12.75	13.25	15.45	16.15	16.25	16.50	16.50
1935	12.15	11.65	10.45	10.05	10.20	10.25	10.40	12.35	12.55	12.50	13.20	13.75
1934	10.44	10.87	12.00	11.75	11.13	9.75	9.55	9.25	8.65	8.75	9.00	10.15
1933	5.25	5.25	5.25	6.55	8.70	8.80	10.45	10.40	9.95	9.35	8.35	8.75
1932	7.25	6.80	6.75	6.55	6.20	5.60	4.50	5.40	5.75	6.00	5.75	5.50
1931	10.00	9.85	9.75	9.60	8.65	8.50	8.50	8.25	7.95	7.75	7.65	7.50
1930	12.65	13.25	13.20	13.00	12.55	12.05	12.00	12.00	12.25	11.55	10.20	10.00
1929	16.50	16.00	15.55	15.95	15.45	14.95	14.75	15.05	15.05	14.45	13.05	12.50
1928	12.25	12.55	12.75	12.75	12.95	12.60	12.30	12.65	12.90	13.75	14.50	14.50

Heavy Melting Steel, Eastern Pennsylvania

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$17.50	$18.75	$19.75	$20.44	$18.40	$17.03	$18.40	$19.75	$19.22	$16.55	$14.00	$14.00
1936	12.37	13.15	13.46	13.75	12.65	11.70	12.25	13.85	15.37	15.65	14.81	15.63
1935	11.40	11.25	10.60	10.15	10.45	10.45	10.30	11.40	12.20	12.00	12.05	12.25
1934	11.63	11.73	11.70	11.50	11.00	10.40	10.25	9.85	9.60	9.50	9.95	10.85
1933	6.50	6.50	6.50	6.90	9.00	9.50	10.55	12.00	10.70	10.20	9.55	10.50
1932	7.50	7.35	7.35	7.20	6.50	6.25	6.25	6.40	7.25	7.25	7.25	6.50
1931	10.50	10.50	10.50	10.00	9.50	8.75	8.25	8.55	8.75	8.20	7.95	7.50
1930	14.50	14.50	14.95	13.95	13.40	13.25	12.50	12.65	13.00	12.00	11.50	11.00
1929	16.50	16.30	16.25	17.00	16.25	16.25	16.50	16.75	16.37	15.80	15.15	14.50
1928	14.00	14.00	13.75	13.75	13.75	13.15	12.75	12.75	14.65	16.00	15.90	15.50

Compressed Sheets, Detroit (dealers)

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937						1937						
1936	10.45	11.55	12.50	12.10	10.85	10.50	11.05	12.75	14.25	14.40	13.60	13.95
1935	10.00	9.60	7.95	7.75	7.95	8.50	8.75	9.80	10.05	10.05	9.75	9.90
1934	8.50	9.40	10.30	9.70	8.90	7.90	8.00	7.80	7.75	7.50	7.75	9.00
1933	4.00	4.00	4.06	5.15	7.50	7.80	8.85	9.50	8.55	7.35	7.00	7.45
1932	5.55	5.75	5.75	5.70	5.10	4.75	3.75	3.80	5.00	5.50	5.05	4.06
1931	8.92	9.45	9.00	9.00	7.75	6.95	6.95	6.80	6.50	6.15	6.00	6.00
1930	12.00	11.75	11.40	11.25	10.85	10.50	10.50	10.85	11.15	10.90	9.65	8.81
1929	14.65	14.45	14.00	14.00	14.00	13.65	14.00	14.00	14.00	13.40	12.15	11.50
1928	10.38	10.25	10.10	10.63	10.60	10.25	9.88	10.19	11.69	12.50	13.15	13.44

No. 1 Railroad Wrought, Eastern Pennsylvania

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$17.90	$19.00	$20.63	$20.31	$19.30	$18.12	$19.20	$20.50	$21.13	$17.80	$15.75	$15.50
1936	12.50	13.20	14.00	14.25	13.45	13.25	13.75	14.65	15.31	16.00	15.75	16.31
1935	11.75	11.60	11.05	10.35	10.35	10.75	10.75	11.55	12.25	12.25	12.25	12.25
1934	12.75	12.75	12.75	12.25	11.55	10.00	10.20	9.80	9.50	10.25	10.70	11.65
1933	6.50	6.50	6.75	7.35	10.25	10.25	11.60	13.00	11.60	10.75	10.15	11.00
1932	9.35	9.00	9.00	7.95	7.75	6.70	6.25	6.25	7.75	7.25	7.25	6.50
1931	13.25	12.50	11.00	11.00	11.00	10.50	10.00	9.75	9.75	9.50	9.50	9.50
1930	15.25	15.25	15.25	15.75	15.40	15.25	14.25	14.25	14.25	14.25	13.50	13.50
1929	15.50	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.13	16.00	16.25	15.25
1928	15.25	15.25	15.25	15.25	15.25	15.25	15.25	14.80	15.10	15.50	15.50	15.50

No. 1 Cast, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$17.50	$18.15	$19.20	$19.50	$18.80	$18.70	$18.90	$20.25	$19.80	$17.95	$16.50	$16.00
1936	13.75	13.55	14.60	14.90	14.65	15.00	15.15	16.00	16.75	17.00	17.00	17.25
1935	13.50	13.25	12.40	11.65	12.50	12.70	13.50	13.75	14.00	13.95	13.75	13.75
1934	12.50	12.65	13.10	12.85	12.40	13.00	13.00	12.40	12.00	12.00	12.20	13.50
1933	8.55	9.00	9.00	9.00	10.10	10.40	10.65	10.60	10.60	11.20	11.00	11.00
1932	10.00	9.80	9.50	9.50	9.20	9.00	8.60	8.50	9.50	9.50	9.25	9.00
1931	12.50	12.50	12.50	12.20	11.50	10.85	10.00	10.00	10.00	10.00	10.00	10.00
1930	14.75	14.50	14.50	15.00	14.50	14.00	14.00	14.00	14.00	13.40	12.40	12.50
1929	15.30	14.50	15.20	15.45	15.00	15.00	15.00	15.00	15.00	15.00	14.90	14.50
1928	14.50	14.50	14.50	14.75	14.60	14.00	14.00	14.05	14.25	14.55	15.10	14.70

No. 1 Cast, Eastern Pennsylvania

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$18.85	$19.00	$20.69	$22.50	$20.35	$18.81	$19.55	$21.65	$20.50	$18.95	$16.75	$16.75
1936	12.75	13.45	17.00	14.88	14.15	13.75	14.31	15.55	16.62	16.65	16.25	17.75
1935	11.60	11.95	11.75	11.55	11.50	11.50	11.50	11.60	12.25	12.25	12.75	12.75
1934	11.50	11.65	12.30	12.50	12.15	12.00	11.25	11.00	11.00	11.00	11.00	12.25
1933	9.00	9.00	9.00	9.10	10.25	10.35	11.20	11.75	12.40	12.00	11.95	12.00
1932	11.20	10.00	10.00	9.50	9.25	9.00	9.00	9.25	9.25	9.00	9.00	9.00
1931	12.80	13.00	13.00	13.00	12.75	12.50	12.50	12.50	12.50	12.50	11.70	11.50
1930	16.00	15.75	15.75	15.50	15.00	14.75	13.50	13.50	13.50	13.50	13.50	12.50
1929	16.75	16.75	16.50	16.50	16.50	16.50	16.50	16.50	16.25	16.25	16.00	16.00
1928	16.75	16.75	16.75	16.25	16.25	16.00	16.00	15.75	16.20	17.00	16.50	16.50

No. 1 Cast, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$15.50	$16.55	$17.65	$17.75	$15.65	$15.00	$15.00	$16.75	$14.75	$13.75	$12.60	$12.25
1936	12.25	12.75	13.75	13.75	12.30	12.25	12.25	13.65	13.75	14.15	14.25	14.25
1935	11.55	10.90	9.40	9.25	9.40	9.55	9.55	10.95	11.55	11.75	12.00	12.25
1934	8.90	9.00	9.05	9.05	9.00	8.50	8.50	8.50	8.15	8.40	8.75	9.55
1933	5.95	6.00	6.20	7.15	8.75	8.75	9.90	10.50	9.85	9.25	8.00	8.25
1932	8.90	8.90	8.40	7.85	7.00	6.40	6.15	6.45	7.30	7.30	6.85	6.70
1931	10.65	10.65	10.65	10.25	9.80	9.80	9.80	9.80	9.80	9.80	9.00	8.95
1930	15.10	15.25	15.70	15.60	14.80	14.25	13.45	13.45	13.45	12.90	10.95	10.65
1929	17.70	17.90	17.90	17.90	17.25	16.25	16.25	16.25	16.80	15.65	15.35	15.10
1928	15.75	15.75	15.65	15.65	15.90	15.95	15.95	15.95	16.30	16.55	16.90	17.35

Cast Borings, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$14.40	$14.00	$14.40	$14.50	$14.10	$14.00	$14.65	$15.20	$14.90	$12.95	$ 8.75	$ 7.25
1936	8.30	8.75	8.70	8.75	8.75	8.05	7.90	10.90	11.95	11.65	11.50	13.00
1935	6.50	6.90	7.00	6.10	6.00	6.65	6.50	7.00	7.30	8.15	8.15	8.00
1934	7.30	8.15	8.70	8.50	8.25	7.75	7.25	7.05	6.25	5.50	5.90	6.00
1933	5.70	5.70	5.55	5.70	6.90	7.65	9.05	9.80	9.05	8.30	7.60	7.50
1932	6.75	6.50	6.75	6.65	6.40	5.50	4.75	5.15	5.95	6.25	6.50	5.90
1931	7.70	7.70	7.65	7.60	7.50	7.75	7.05	7.50	7.45	7.50	7.10	6.80
1930	11.10	12.00	11.15	10.75	10.50	9.88	8.50	8.50	8.90	8.40	7.75	7.15
1929	12.55	12.25	11.50	12.15	11.55	11.85	12.10	12.50	12.40	11.80	11.15	10.75
1928	11.50	11.00	10.70	10.60	10.70	10.40	9.80	10.50	12.00	12.40	12.00	12.50

Low Phosphorus Scrap, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$24.00	$25.15	$26.70	$27.15	$25.55	$25.00	$25.15	$26.50	$25.65	$22.15	$18.70	$17.50
1936	17.00	17.25	17.95	17.90	17.20	15.90	17.40	18.75	20.25	20.25	21.00	22.40
1935	15.15	15.00	14.30	15.00	15.40	15.25	15.10	15.50	16.15	16.50	16.00	16.70
1934	16.00	16.25	16.90	16.90	15.55	14.45	14.50	14.00	13.50	13.40	13.75	15.00
1933	10.00	10.25	10.70	11.10	13.55	13.70	14.55	16.00	15.10	14.30	13.50	13.50
1932	13.90	13.00	13.15	13.85	13.00	12.00	10.60	10.50	10.50	10.60	10.75	10.50
1931	17.20	17.50	17.50	17.20	16.25	14.75	13.50	14.00	14.00	14.00	14.00	14.00
1930	21.50	21.75	21.85	21.60	20.50	19.50	19.00	19.35	20.00	19.30	17.60	17.50
1929	22.00	22.50	22.35	23.25	22.40	22.25	22.50	22.80	23.00	22.20	21.75	20.50
1928	18.85	18.50	18.20	18.35	18.50	18.50	18.50	19.00	20.00	20.75	21.00	21.00

Machine Shop Turnings, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$14.15	$14.25	$15.55	$15.25	$14.80	$14.00	$14.05	$15.05	$14.75	$11.75	$ 8.55	$ 7.25
1936	9.75	10.20	10.50	10.50	9.75	9.40	9.50	10.70	12.40	12.45	11.75	12.90
1935	8.95	8.80	7.40	7.40	8.15	8.25	8.15	8.80	9.55	9.70	9.45	9.65
1934	9.05	10.00	10.75	10.15	8.20	7.45	7.50	8.00	7.30	7.00	7.20	8.50
1933	6.25	6.25	6.30	6.75	8.00	8.40	9.35	10.45	9.75	9.30	8.00	8.00
1932	6.95	7.10	7.25	6.75	6.30	5.25	5.00	5.25	5.95	6.00	6.25	6.00
1931	6.00	6.80	7.80	7.30	6.75	6.50	6.70	7.30	7.50	7.20	7.00	7.00
1930	11.50	11.75	11.00	11.00	10.20	9.50	8.70	8.00	8.00	7.20	6.15	6.00
1929	12.50	11.25	10.65	11.05	11.00	11.35	11.85	12.40	12.00	11.40	10.75	10.25
1928	10.60	10.15	10.15	10.25	9.90	9.20	8.80	9.65	11.00	11.25	10.85	12.00

Iron Car Wheels, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$18.65	$19.50	$20.50	$21.60	$19.95	$19.35	$19.00	$20.75	$19.50	$17.35	$15.60	$14.50
1936	13.45	14.25	14.75	14.35	13.50	13.50	13.50	15.65	16.25	16.65	16.75	17.25
1935	12.25	12.15	11.15	10.75	10.75	10.75	10.75	12.45	12.75	12.75	13.05	13.25
1934	10.75	11.50	12.50	12.25	12.00	10.40	10.25	10.00	9.75	9.75	9.75	10.60
1933	7.65	8.15	8.35	8.75	9.75	9.75	9.75	9.75	9.75	9.50	9.25	9.75
1932	7.75	7.00	7.00	6.75	6.35	6.00	5.50	6.15	7.00	7.00	7.10	7.00
1931	11.25	10.75	10.60	9.50	9.25	10.20	10.00	9.90	9.50	9.50	9.00	8.75
1930	14.05	14.20	14.50	14.45	13.80	13.50	13.50	13.50	13.50	13.10	12.00	11.50
1929	14.10	14.50	14.50	14.75	14.50	14.20	13.60	14.00	14.00	14.00	13.60	13.65
1928	13.70	14.25	13.95	13.50	13.45	13.10	13.00	13.00	13.00	13.10	14.05	14.05

Rails for Rolling, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$19.40	$20.75	$22.25	$23.35	$21.45	$19.50	$20.30	$21.75	$20.35	$17.25	$15.10	$14.00
1936	14.25	15.50	15.75	15.75	14.65	14.00	14.00	16.40	16.75	16.95	17.25	17.25
1935	12.90	12.55	11.55	11.05	11.05	11.25	11.25	13.65	13.90	14.00	14.30	14.75
1934	11.25	12.00	12.75	12.75	12.37	11.25	10.95	10.50	10.10	9.85	10.25	11.40
1933	8.00	7.75	7.95	8.50	10.25	10.25	11.15	11.25	11.25	11.10	10.25	10.25
1932	10.30	9.85	9.50	8.90	8.25	7.75	6.60	6.50	7.00	8.00	8.25	8.00
1931	13.00	12.10	12.00	11.85	11.15	10.90	10.50	10.50	10.50	10.50	10.00	10.00
1930	14.65	14.80	15.00	15.00	14.85	14.55	14.50	14.50	14.50	14.10	13.10	13.00
1929	17.10	17.50	17.50	17.50	17.50	17.50	17.50	17.75	17.60	17.05	15.30	14.60
1928	15.00	15.00	14.45	14.00	14.35	14.85	14.50	15.00	15.80	16.40	16.50	16.50

Finished Material

Per Pound f. o. b.

Steel Bars, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.20c	2.20c	2.40c	2.45c	2.45c	2.45c	2.45c	2.45c	2.45c	2.45c	2.45c	2.45c
1936	1.85	1.85	1.85	1.85	1.85	1.85	1.95	1.95	1.95	2.05	2.05	2.05
1935	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.85	1.85	1.85	1.85
1934	1.75	1.75	1.75	1.85	1.90	1.90	1.80	1.80	1.80	1.80	1.80	1.80
1933	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.75	1.75	1.75
1932	1.55	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1931	1.65	1.65	1.65	1.65	1.65	1.65	1.60	1.60	1.60	1.60	1.60	1.60
1930	1.90	1.85	1.85	1.80	1.75	1.75	1.70	1.65	1.60	1.60	1.60	1.60
1929	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90	1.90
1928	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90

Tank Plates, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.05c	2.05c	2.20c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c
1936	1.80	1.80	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.90	1.90	1.90
1935	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
1934	1.70	1.70	1.70	1.80	1.85	1.85	1.80	1.80	1.80	1.80	1.80	1.80
1933	1.60	1.60	1.60	1.55	1.50	1.55	1.60	1.60	1.60	1.70	1.70	1.70
1932	1.55	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1931	1.65	1.65	1.65	1.65	1.65	1.65	1.60	1.60	1.60	1.60	1.60	1.50
1930	1.90	1.85	1.80	1.80	1.75	1.70	1.65	1.65	1.60	1.60	1.60	1.60
1929	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90
1928	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90

Structural Shapes, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.05c	2.05c	2.20c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c	2.25c
1936	1.80	1.80	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.90	1.90	1.90
1935	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
1934	1.70	1.70	1.70	1.80	1.85	1.85	1.80	1.80	1.80	1.80	1.80	1.80
1933	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.70	1.70	1.70
1932	1.55	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1931	1.60	1.60	1.60	1.65	1.65	1.65	1.60	1.60	1.60	1.60	1.60	1.50
1930	1.90	1.85	1.80	1.80	1.75	1.70	1.65	1.65	1.60	1.60	1.60	1.60
1929	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90
1928	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90

No. 10 Blue Annealed Sheets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.15c	2.15c	2.35c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c
1936	1.85	1.85	1.85	1.85	1.85	1.85	1.95	1.95	1.95	1.95	1.95	2.10
1935	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
1934	1.75	1.75	1.75	1.90	2.00	2.00	1.85	1.85	1.85	1.85	1.85	1.85
1933	1.65	1.60	1.55	1.55	1.55	1.65	1.75	1.65	1.70	1.75	1.75	1.75
1932	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1931	1.90	1.90	1.90	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
1930	2.15	2.10	2.10	2.10	2.00	2.00	2.00	1.95	1.95	1.95	1.90	1.90
1929	2.10	2.10	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.15
1928	2.10	2.10	2.10	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.10

Automobile Sheets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	3.25c	3.25c	3.50c	3.55c	2.55c	3.55c	3.55c	3.55c	3.55c	3.55c	3.55c	3,55c
1936	2.95	2.95	2.95	2.95	2.95	2.95	3.05	3.05	3.05	3.05	3.05	3.05
1935	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95
1934	2.75	2.75	2.75	3.05	3.15	3.10	2.95	2.95	2.95	2.95	2.95	2.95
1933	2.40	2.45	2.45	2.55	2.55	2.55	2.55	2.60	2.75	2.75	2.75	2.75
1932	2.90	2.85	2.85	2.80	2.80	2.80	2.80	2.70	2.75	2.65	2.60	2.60
1931	3.30	3.30	3.30	3.15	3.05	3.10	3.10	3.10	3.10	3.10	3.10	3.00
1930	3.90	3.90	3.90	3.80	3.80	3.60	3.60	3.60	3.60	3.45	3.35	3.30
1929	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.05	4.00	4.00
1928	4.00	4.10	4.15	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.05	4.10

No. 24 Black Sheets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.80c	2.80c	3.10c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c
1936	2.40	2.40	2.40	2.40	2.40	2.40	2.50	2.50	2.50	2.60	2.60	2.75
1935	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
1934	2.25	2.25	2.25	2.50	2.65	2.65	2.45	2.40	2.40	2.40	2.40	2.40
1933	2.05	2.00	2.00	2.00	2.00	2.10	2.25	2.25	2.25	2.25	2.25	2.25
1932	2.20	2.15	2.20	2.20	2.20	2.20	2.20	2.15	2.10	2.10	2.10	2.20
1931	2.35	2.35	2.35	2.25	2.25	2.15	2.40	2.40	2.40	2.40	2.40	2.40
1930	2.70	2.65	2.65	2.65	2.55	2.55	2.55	2.50	2.40	2.40	2.35	2.35
1929	2.85	2.85	2.85	2.90	2.95	2.95	2.85	2.85	2.85	2.80	2.75	2.75
1928	2.80	2.85	2.85	2.75	2.75	2.70	2.65	2.65	2.70	2.70	2.80	2.85

No. 24 Galvanized Sheets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	3.40c	3.40c	3.70c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c
1936	3.10	3.10	3.10	3.10	3.10	3.10	3.20	3.20	3.20	3.20	3.20	3.35
1935	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10
1934	2.85	2.85	2.85	3.10	3.25	3.25	3.10	3.10	3.10	3.10	3.10	3.10
1933	2.70	2.50	2.60	2.65	2.70	2.70	2.85	2.85	2.85	2.85	2.95	2.85
1932	2.80	2.75	2.80	2.85	2.85	2.85	2.85	2.80	2.75	2.80	2.85	2.85
1931	2.90	2.90	2.90	2.85	2.80	2.80	2.90	2.90	2.90	2.90	2.90	2.90
1930	3.35	3.30	3.30	3.30	3.25	3.20	3.15	3.10	3.00	3.00	2.95	2.90
1929	3.60	3.60	3.60	3.65	3.70	3.65	3.60	3.55	3.50	3.50	3.45	3.40
1928	3.65	3.65	3.75	3.65	3.65	3.55	3.50	3.50	3.50	3.50	3.55	3.60

Cold-Finished Steel Bars, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.55c	2.55c	2.85c	2.90c	2.90c	2.90c	2.90c	2.90c	2.90c	2.90c	2.90c	2.90c
1936	2.10	2.10	2.10	2.10	2.10	2.15	2.25	2.25	2.25	2.35	2.35	2.55
1935	2.10	2.10	2.10	2.00	1.95	1.95	1.95	1.95	1.95	1.95	1.95	2.05
1934	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
1933	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.95	1.95	1.95	1.95	1.95
1932	2.00	2.00	1.90	1.90	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1931	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.00
1930	2.15	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.05	2.00
1929	2.20	2.20	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.20	2.20
1928	2.30	2.25	2.25	2.20	2.20	2.15	2.10	2.15	2.20	2.20	2.20	2.20

Tin Plate, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$4.85	$4.85	$4.85	$5.25	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35
1936	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
1935	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
1934	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
1933	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.65	4.65	4.65	5.25
1932	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.50	4.25
1931	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.75	4.75	4.75
1930	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.00	5.00	5.00
1929	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35
1928	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.30	5.35

Cold-Rolled Strip, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.85c	2.85c	3.15c	3.20c	3.20c	3.20c	3.20c	3.20c	3.20c	3.20c	3.20c	3.20c
1936	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.80
1935	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1934	2.40	2.40	2.40	2.65	2.80	2.80	2.60	2.60	2.60	2.60	2.60	2.60
1933	1.95	1.80	1.85	1.80	1.90	2.00	2.25	2.25	2.30	2.40	2.40	2.40
1932	2.00	1.90	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.95	2.00	2.00
1931	2.25	2.25	2.25	2.20	2.15	2.15	2.15	2.15	2.15	2.15	2.10	2.05
1930	2.70	2.65	2.60	2.55	2.50	2.45	2.45	2.40	2.35	2.35	2.35	2.25
1929	2.85	2.85	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1928	3.00	3.10	3.15	*2.75	2.75	2.75	2.75	2.70	2.75	2.75	2.80	2.85

*April, 1928, and subsequently, prices are for 3 tons or over instead of less than 3 tons.

Hot-Rolled Strip, Wide, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.15c	2.15c	2.35c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c
1936	1.85	1.85	1.85	1.85	1.85	1.85	1.95	1.95	1.95	1.95	1.95	2.10
1935	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
1934	1.75	1.75	1.75	1.95	2.00	2.00	1.85	1.85	1.85	1.85	1.85	1.85
1933	1.45	1.45	1.45	1.45	1.55	1.55	1.60	1.65	1.70	1.75	1.75	1.75
1932	1.40	1.40	1.40	1.45	1.50	1.50	1.45	1.45	1.45	1.45	1.45	1.45
1931	1.55	1.55	1.55	1.55	1.50	1.50	1.55	1.55	1.55	1.55	1.50	1.45
1930	1.85	1.80	1.80	1.70	1.70	1.70	1.65	1.65	1.65	1.60	1.55	1.55
1929	1.80	1.85	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
1928	1.85	1.85	1.90	1.90	1.85	1.85	1.90	1.85	1.80	1.80	1.80	1.80

Plain Wire, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.60c	2.60c	2.85c	2.90c	2.90c	2.90c	2.90c	2.90c	2.90c	2.90c	2.90c	2.90c
1936	2.30	2.30	2.30	2.40	2.40	2.40	2.40	2.40	2.40	2.50	2.50	2.60
1935	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
1934	2.20	2.20	2.20	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
1933	2.15	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.20
1932	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1931	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1930	2.40	2.40	2.40	2.40	2.35	2.30	2.30	2.30	2.30	2.30	2.30	2.25
1929	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.45	2.40	2.40	2.40
1928	2.40	2.45	2.50	2.50	2.50	2.50	2.45	2.40	2.40	2.40	2.40	2.50

Wire Nails, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.25c	2.25c	2.70c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c
1936	2.40	2.40	2.15	2.10	2.10	2.10	2.10	2.10	1.95	2.05	2.05	2.20
1935	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.55	2.40	2.40	2.40	2.40
1934	2.35	2.35	2.35	2.50	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1933	1.90	1.85	1.85	1.85	1.85	1.85	2.05	2.10	2.10	2.10	2.10	2.35
1932	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
1931	1.90	1.90	1.90	1.90	1.90	1.80	1.85	1.90	1.90	1.90	1.90	1.90
1930	2.35	2.30	2.30	2.25	2.15	2.15	2.10	2.05	2.00	2.00	1.95	1.90
1929	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.50	2.45	2.40	2.40
1928	2.50	2.60	2.65	2.60	2.60	2.60	2.55	2.55	2.55	2.55	2.55	2.65

Bar Iron, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.10c	2.10c	2.35c	2.35c	2.35c	2.35c	2.35c	2.35c	2.35c	2.35c	2.35c	2.35c
1936	1.75	1.75	1.75	1.75	1.75	1.75	1.85	1.85	1.85	1.95	1.95	1.95
1935	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
1934	1.60	1.60	1.60	1.60	1.75	1.80	1.77	1.75	1.75	1.75	1.75	1.75
1933	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	*1.60	1.60	1.60	1.60
1932	1.60	1.70	1.70	1.70	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
1931	1.70	1.75	1.70	1.80	1.80	1.70	1.70	1.70	1.70	1.70	1.65	1.60
1930	2.00	1.95	1.95	1.95	1.90	1.90	1.90	1.80	1.75	1.75	1.70	1.70
1929	2.00	2.05	2.00	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.00	2.00
1928	1.90	1.95	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

*Beginning September, Terre Haute, Ind., base quoted freight to Chicago, 18 cents.

Rail Steel Bars, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.10c	2.10c	2.35c	2.35c	2.35c	2.35c	2.35c	2.35c	2.35c	2.35c	2.35c	2.35c
1936	1.75	1.75	1.75	1.75	1.75	1.75	1.85	1.85	1.85	1.95	1.95	1.95
1935	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
1934	1.70	1.70	1.70	1.79	1.85	1.85	1.77	1.75	1.75	1.75	1.75	1.75
1933	1.50	1.45	1.45	1.45	1.50	1.50	1.50	1.50	1.60	1.70	1.70	1.70
1932	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
1931	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.50	1.50	1.50
1930	1.85	1.85	1.85	1.85	1.80	1.75	1.75	1.65	1.65	1.65	1.65	1.65
1929	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.95	1.90
1928	1.80	1.80	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.90	1.95	2.00

Tie Plates, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.00c	2.10c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c
1936	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	2.00	2.00	2.00	2.00
1935	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
1934	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
1933	1.75	1.75	1.75	1.75	1.75	1.75	1.80	1.80	1.80	1.80	1.80	1.80
1932	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.75	1.75	1.75
1931	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90
1930	2.10	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.00	1.95
1929	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
1928	2.25	2.25	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15

Railroad Spikes, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.90c	2.90c	3.05c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c
1936	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.75	2.75	2.75	2.85
1935	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.60
1934	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
1933	2.40	2.40	2.25	2.25	2.15	2.15	2.40	2.40	2.40	2.40	2.40	2.40
1932	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.40	2.40	2.40
1931	2.80	2.80	2.80	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.65
1930	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1929	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1928	2.70	2.75	2.75	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80

Angle Bars, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	2.70c	2.70c	2.70c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c
1936	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
1935	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
1934	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
1933	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
1932	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.65	2.65
1931	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1930	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1929	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1928	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75

Track Bolts, Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	4.00c	4.00c	4.35c	4.35c	4.35c	4.35c	4.35c	4.35c	4.35c	4.35c	4.35c	4.35c
1936	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.75	3.75	3.75	3.75
1935	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.60
1934	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55
1933	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.40	3.40	3.40	3.45	3.45
1932	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1931	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.70
1930	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
1929	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
1928	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80

Structural Rivets, Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	3.25c	3.25c	3.45c	3.60c	3.60c	3.60c	3.60c	3.60c	3.60c	3.60c	3.60c	3.60c
1936	2.90	2.90	2.90	2.90	2.90	2.95	3.05	3.05	3.05	3.05	3.05	3.20
1935	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
1934	2.75	2.75	2.75	2.90	3.00	3.00	2.95	2.90	2.90	2.90	2.90	2.90
1933	2.25	2.25	2.25	2.25	2.25	2.35	2.50	2.50	2.50	2.60	2.75	2.75
1932	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
1931	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.55	2.30	2.25	2.25
1930	3.10	3.10	3.10	3.10	3.00	2.90	2.90	2.75	2.75	2.75	2.75	2.75
1929	2.85	2.90	2.95	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10
1928	2.75	2.75	2.80	2.90	2.90	2.90	2.90	2.85	2.80	2.80	2.80	2.80

Cast Iron Pipe, New York

6-Inch and Larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$45.00	$45.00	$48.75	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00
1936	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	44.50	45.00
1935	42.00	42.00	42.00	42.25	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00
1934	40.00	40.00	40.00	40.00	40.00	40.50	42.00	42.00	42.00	42.00	42.00	42.00
1933	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	34.00	34.50	38.60	40.00
1932	28.00	28.00	28.00	28.00	28.00	26.50	26.00	30.00	32.00	32.00	32.00	32.00
1931	38.10	37.50	37.50	37.50	37.75	34.50	33.70	32.00	28.50	29,10	29.00	28.00
1930	36.90	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50
1929	38.85	39.80	39.80	39.05	38.20	38.00	37.90	37.50	37.50	37.50	36.75	36.50
1928	37.15	36.75	36.75	37.25	37.65	38.25	28.08	37.60	37.60	37.10	37.20	38.60

Cast Iron Pipe, Birmingham

6-Inch and Larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$41.00	$41.00	$44.75	$46.00	$46.00	$46.00	$46.00	$46.00	$46.00	$46.00	$46.00	$46.00
1936	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	41.00
1935	38.00	38.00	38.00	38.50	39.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00
1934	36.00	36.00	36.00	36.00	36.00	36.40	38.00	38.00	38.00	38.00	38.00	38.00
1933	32.00	32.00	32.00	32.00	32.00	34.25	35.00	35.00	35.00	35.00	35.25	36.00
1932	33.00	32.20	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00
1931	37.00	37.00	36.50	35.00	35.00	35.00	35.00	35.00	33.00	33.00	33.00	33.00
1930	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00
1929	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00
1928	29.00	29.00	28.50	30.00	33.50	31.00	32.50	34.00	34.00	35.00	36.40	37.00

Cast Iron Pipe, Chicago

6-Inch and Larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1937	$49.00	$49.00	$51.80	$54.00	$54.00	$54.00	$54.00	$54.00	$54.00	$54.00	$54.10	$54.20
1936	47.40	47.40	47.40	47.40	47.40	47.00	47.40	47.40	47.40	47.40	47.40	49.40
1935	46.00	46.00	46.00	46.70	47.70	47.40	47.40	47.40	47.40	47.40	47.40	47.40
1934	44.00	44.00	44.00	44.00	44.00	44.80	46.00	46.00	46.00	46.00	46.00	46.00
1933	40.40	40.40	40.40	40.40	40.40	42.65	43.40	43.40	43.40	43.00	43.25	44.00
1932	40.40	38.80	38.40	34.40	34.40	34.40	34.40	34.40	38.90	40.40	40.40	40.00
1931	45.20	45.20	43.70	42.10	42.20	42.00	42.00	39.00	40.00	40.00	40.00	40.00
1930	44.40	45.20	45.20	45.20	44.00	43.20	44.80	45.20	45.20	45.20	45.20	45.20
1929	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20	45.20
1928	36.20	36.20	36.70	38.20	39.00	39.00	41.45	42.00	42.20	42.70	45.00	45.20

IRON AND STEEL PRICE COMPOSITE

An Unweighted Average of 25 Per-Ton Quotations, Including 5 Pig Iron, 3 Semifinished Steel and 12 Finished Steel Products

1932

Monthly Averages

January	$29.65
February	29.24
March	29.28
April	29.44
May	29.34
June	29.09
July	28.87
August	28.77
September	28.93
October	28.90
November	28.79
December	28.28
Average for year	29.05

1933

Jan. 7	$28.26
14	28.27
21	28.08
28	28.08
Average for January	28.17
Feb. 4	27.99
11	27.92
18	27.92
25	27.91
Average for February	27.94
Mar. 4	27.90
11	27.91
18	27.91
25	27.95
Average for March	27.92
April 1	27.71
8	27.74
15	27.77
22	27.80
29	27.90
Average for April	27.78
May 6	28.19
13	28.28
20	28.42
27	28.43
Average for May	28.33
June 3	28.46
10	28.75
17	28.77
24	28.85
Average for June	28.71
July 1	29.23
8	29.61
15	29.82
22	29.80
29	29.88
Average for July	29.67
Aug. 5	29.93
12	29.91
19	29.91
26	29.94
Average for August	29.92
Sept. 2	30.27
9	30.29
16	30.26
23	30.31
30	30.65
Average for Sept.	30.36
Oct. 7	30.59
14	30.52
21	30.58
28	30.42
Average for October	30.53
Nov. 4	30.27
11	30.28
18	30.21
25	30.24
Average for November	30.25
Dec. 2	30.92
9	30.96
16	31.01
23	31.07
30	31.07
Average for December	31.01
Average for year	29.25

1934

Jan. 6	$31.10
13	31.13
20	31.17
27	31.20
Average for January	31.15
Feb. 3	31.21
10	31.30
17	31.33
24	31.34
Average for February	31.30
Mar. 3	31.36
10	31.43
17	31.42
24	31.34
31	31.34
Average for March	31.38
April 7	31.33
14	33.15
21	33.12
28	33.09
Average for April	32.67
May 5	33.03
12	33.00
19	32.94
26	32.89
Average for May	32.97
June 2	32.81
9	32.83
16	32.84
23	33.16
30	33.15
Average for June	32.96
July 7	32.38
14	32.33
21	32.28
28	32.28
Average for July	32.32
Aug. 4	32.28
11	32.23
18	32.23
25	32.22
Average for August	32.24
Sept. 1	32.17
8	32.17
15	32.14
22	32.13
29	32.13
Average for September	32.15
Oct. 6	32.09
13	32.09
20	32.09
27	32.12
Average for October	32.10
Nov. 3	32.13
10	32.13
17	32.15
24	32.18
Average for November	32.15
Dec. 1	32.22
8	32.35
15	32.44
22	32.46
29	32.46
Average for December	32.39
Average for year	32.15

1935

Jan. 5	$32.51
12	32.57
19	32.62
26	32.60
Average for January	32.58
Feb. 2	32.56
9	32.56
16	32.54
23	32.50
Average for February	32.54
Mar. 2	32.42
9	32.39
16	32.38
23	32.33
30	32.30
Average for March	32.36
April 6	32.27
13	32.27
20	32.31
27	32.30
Average for April	32.29
May 4	32.30
11	32.34
18	32.34
25	32.41
Average for May	32.35
June 1	32.43
8	32.45
15	32.41
22	32.40
29	32.39
Average for June	32.42
July 6	32.39
13	32.40
20	32.42
27	32.55
Average for July	32.44
Aug. 3	32.59
10	32.64
17	32.68
24	32.72
31	32.78
Average for August	32.68
Sept. 7	32.79
14	32.81
21	32.83
28	32.83
Average for September	32.82
Oct. 5	32.82
12	32.86
19	32.83
26	32.85
Average for October	32.84
Nov. 2	32.98
9	33.16
16	33.16
23	33.17
30	33.28
Average for November	33.15
Dec. 7	33.30
14	33.32
21	33.31
28	33.31
Average for December	33.31
Average for year	32.65

1936

Jan. 4	$33.31
11	33.33
18	33.34
25	33.38
Average for January	33.34
Feb. 1	33.40
8	33.44
15	33.45
22	33.54
29	33.59
Average for February	33.48
Mar. 7	33.60
14	33.04
21	33.05
28	33.13
Average for March	33.20
April 4	33.13
11	33.11
18	33.09
25	33.08
Average for April	33.10
May 2	33.00
9	32.96
16	32.94
23	32.87
30	32.83
Average for May	32.92
June 6	32.81
13	32.77
20	32.77
27	32.79
Average for June	32.79
July 4	33.48
11	33.48
18	33.49
25	33.51
Average for July	33.49
Aug. 1	33.72
8	33.82
15	33.88
22	33.94
29	34.03
Average for August	33.88
Sept. 5	34.10
12	34.10
19	34.22
26	34.19
Average for September	34.15
Oct. 3	34.62
10	34.60
17	34.68
24	34.66
31	34.62
Average for October	34.65
Nov. 7	34.60
14	34.60
21	34.59
28	34.79
Average for November	34.64
Dec. 5	34.99
12	35.08
19	35.18
27	35.33
Average for December	35.15
Average for year	33.73

1937

Jan. 2	$36.48
9	36.52
16	36.55
23	36.59
30	36.62
Average for January	36.55
Feb. 6	36.64
13	36.67
20	36.71
27	36.95
Average for February	36.74
Mar. 6	39.47
13	39.99
20	40.10
27	40.11
Average for March	39.92
April 3	40.19
10	40.55
17	40.47
24	40.36
Average for April	40.39
May 1	40.25
8	40.14
15	40.05
22	39.97
29	39.89
Average for May	40.06
June 5	39.86
12	39.84
19	39.80
26	39.78
Average for June	39.82
July 3	39.83
10	39.91
17	40.04
24	40.11
31	40.27
Average for July	40.03
Aug. 7	40.32
14	40.32
21	40.36
28	40.36
Average for August	40.34
Sept. 4	40.27
11	40.21
18	40.19
25	39.98
Average for September	40.16
Oct. 2	39.81
9	39.73
16	39.60
23	39.47
30	39.33
Average for October	39.59
Nov. 6	39.17
13	38.93
20	38.90
27	38.86
Average for November	38.96
Dec. 4	38.86
Dec. 11	38.88

For steel ingot and pig iron production see Pages 296 and 297, respectively.

European Iron and Steel Domestic Prices, 1937

At Works or Furnace

BRITISH PRICES IN POUNDS STERLING, PER GROSS TON

At Works or Furnace

British Prices in Pounds Sterling Per Gross Ton at Current Rate of Exchange

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d
Foundry pig iron, silicon 2.50-3.00*	4- 1-0	4- 1-0	4- 1-0	4- 1-0	4- 1-0	5- 1-0	5- 1-0	5- 1-0	5- 1-0	5- 1-0	5- 6-0	5- 6-0
Basic pig iron*	3-19-6	4- 2-6	4- 2-6	4- 2-6	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0
Furnace coke	1- 1-6	1- 2-6	1- 4-9	1- 8-0	1-12-6	1-15-6	1-15-6	1-15-6	1-15-6	1-17-6	1-17-6	1-17-6
Billets	6- 5-0	6- 5-0	6- 5-0	6- 5-0	7-17-6	7-17-6	7-17-6	7-17-6	7-17-6	7-17-6	7-17-6	7-17-6
Standard rails	8- 5-0	8- 5-0	8- 5-0	8- 6-3	10- 2-6	10- 2-6	10- 2-6	10- 2-6	10- 2-6	10- 2-6	10- 2-6	10- 2-6
Merchant bars	9-10-0	9-10-0	9-10-0	9-10-0	11- 9-0	11- 9-0	11- 9-0	11- 9-0	11- 9-0	11- 9-0	11- 9-0	11- 9-0
Shapes†	9- 3-0	9- 3-0	9- 3-0	9- 3-0	11- 0-6	11- 0-6	11- 0-6	11- 0-6	11- 0-6	11- 0-6	11- 0-6	11- 0-6
Plates, ship, bridge and tank†	9-16-9	9-16-9	9-16-9	9-16-9	11-13-0	11-14-3	11-14-3	11-14-3	11-14-3	11-14-3	11-14-3	11-14-3
Sheets, black, 24-gage	12- 0-0	12- 0-0	13- 0-0	14- 0-0	15-15-0	15-15-0	15-15-0	15-15-0	15-15-0	15-15-0	15-15-0	15-15-0
Sheets, galvanized, 24-gage, corrugated	14- 0-0	14- 0-0	15-10-0	17- 0-0	19-10-0	19-10-0	19-10-0	19-10-0	19-10-0	19-10-0	19-10-0	19-10-0
Plain wire	11- 0-0	11- 5-0	11-15-0	11-15-0	11-15-0	13- 2-6	14-10 0	17- 0-0	19-10-0	19-10-0	19-10-0	19-10-0
Hoops and bands	10- 5-0	10- 5-0	10- 5-0	10- 5-0	12- 4-0	12- 4-0	12- 4-0	12- 4-0	12- 4-0	12- 4-0	12- 4-0	12- 4-0

*Delivered Middlesbrough. From November, a rebate of 5s per ton was granted to users of pig iron who did not buy foreign.

†Rebates of 15s per ton for shapes and plates and 22s 6d for beams are obtainable in the home trade when the purchaser undertakes to buy only British steel, except in authorized cases.

GERMAN PRICES IN REICHSMARKS, PER METRIC TON

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry pig iron, silicon 2.50-3.00	63	63	63	63	63	63	63	63	63	63	63	63
Hematite pig iron	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50	69.50
Furnace coke	19	19	19	19	19	19	19	19	19	19	19	10
Billets	96.50	96.50	96.50	96.50	96.50	96.50	96.50	96.50	96.50	96.50	96.50	96.50
Standard rails	132	132	132	132	132	132	132	132	132	132	132	132
Merchant bars	110	110	110	110	110	110	110	110	110	110	110	110
Shapes	107	107	107	107	107	107	107	107	107	107	107	107
Plates, 5 millimeters	127	127	127	127	127	127	127	127	127	127	127	127
Sheets, black, 1 to 3 millimeters, basis	144	144	144	144	144	144	144	144	144	144	144	144
Sheets, galvanized, 24-gage, corrugated	370	370	370	370	370	370	370	370	370	370	370	370
Plain wire	173	173	173	173	173	173	173	173	173	173	173	173
Hoops and bands	127	127	127	127	127	127	127	127	127	127	127	127

FRENCH PRICES IN FRENCH FRANCS, PER METRIC TON

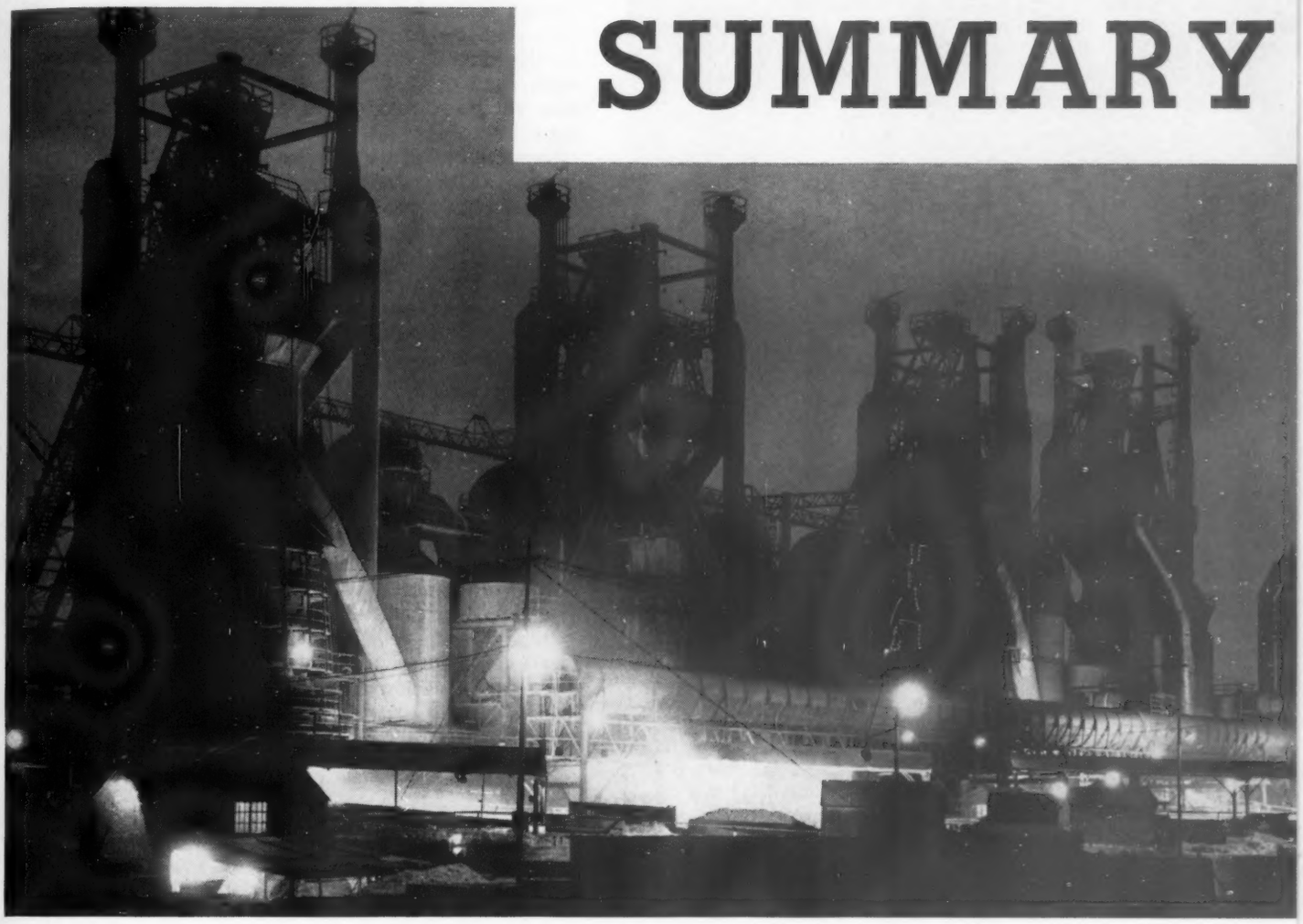
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry pig iron, silicon 2.50-3.00	3.75	378	400	425	425	425	462	505	505	505	554	554
Furnace coke	127	127	137	137	148	158	158	158	178	189	189	189
Billets	590	590	590	655	655	655	655	725	757.50	757.50	790	840
Standard rails	768	780	780	830	975	975	975	1050	1080	1080	1108	1150
Merchant bars	800	800	800	885	885	885	885	960	995	995	1030	1080
Shapes	780	780	780	860	860	860	860	935	970	970	1005	1055
Plates, 5 millimeters	1010	1010	1010	1105	1105	1105	1105	1195	1240	1240	1285	1350
Sheets, black, 2 millimeters	1250	1350	1350	1350	1400	1400	1450	1500	1500	1500	1500	1500
Sheets, galvanized, 0.6-millimeter, corrugated	2100	2100	2100	2100	2150	2150	2150	2250	2250	2250	2210	2200
Plain wire	1320	1320	1340	1360	1360	1360	1360	1480	1520	1520	1520	1520
Hoops and bands	915	915	915	1000	1000	1000	1000	1080	1120	1120	1155	1210

BELGIAN PRICES IN BELGIAN FRANCS, PER METRIC TON

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry pig iron, silicon 2.50-3.00	550	665	730	810	825	825	825	825	800	800	760	760
Furnace coke	147	185	185	185	185	215	215	215	215	215	215	215
Billets	640	640	700	795	835	960	960	960	960	960	960	960
Standard Rails	1200	1200	1250	1250	1250	1375	1375	1375	1375	1375	1375	1375
Merchant bars	775	775	875	975	975	1100	1100	1100	1100	1100	1100	1100
Shapes	775	775	875	975	975	1100	1100	1100	1100	1100	1100	1100
Plates, 5 millimeters	950	950	1135	1245	1245	1245	1375	1375	1375	1375	1375	1375
Sheets, black, 3 millimeters, basis	1150	1215	1340	1460	1460	1460	1575	1575	1575	1575	1575	1575
Galvanized sheets, corrugated, 0.5 millimeter*	2250	2250	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Plain wire	1300	1350	1425	1650	1650	1650	1650	1650	1650	1650	1650	1650
Hoops and bands	950	1010	1100	1350	1400	1500	1550	1550	1550	1550	1550	1550

*Delivered.

EUROPEAN MARKET SUMMARY



■ Four blast furnace stacks at the works of Stewarts & Lloyds, Corby, England, are said to be the most modern in all Europe. They are producing pig iron by the basic-bessemer process recently developed for utilizing low-grade ores. They were built by H. A. Brassert & Co., Chicago. Similar stacks are being built to make available native ores in Germany. Photo copyright by Stewarts & Lloyds

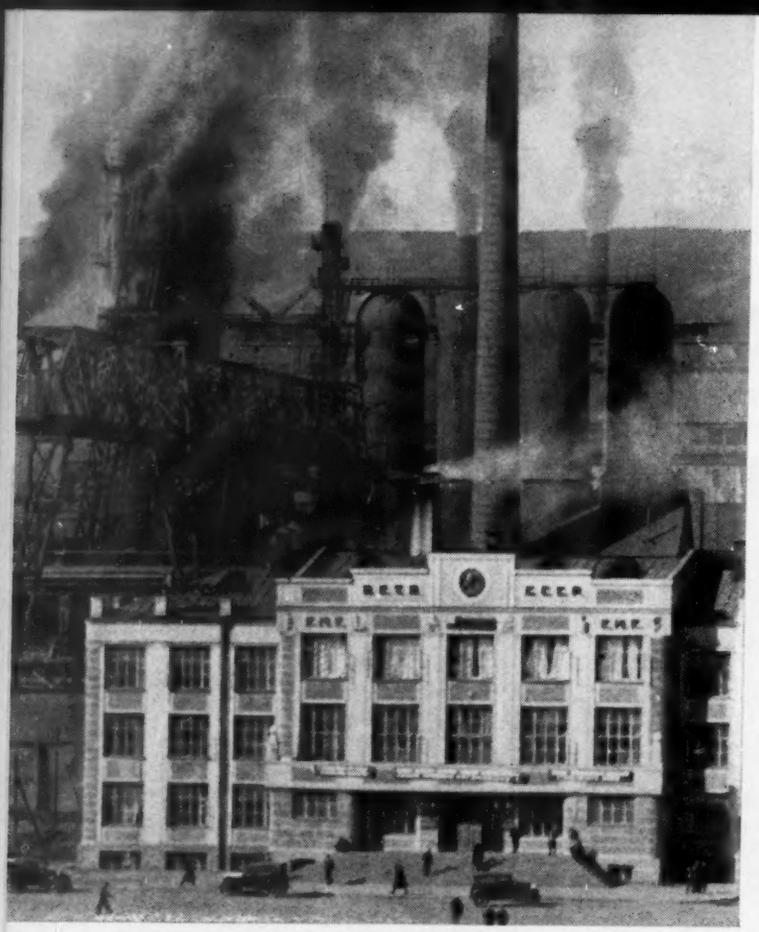
Europe Makes High Mark in Steel; Output Now Receding

BY VINCENT DELPORT,
European Manager, STEEL

■ VIEWING the steel trade of Europe generally, no one could say that 1937 had been devoid of variety. With the exception of some clouds on the political horizon, the year started under favorable auspices. Demand for iron and steel from almost every part of the world was considerable, prices were on the up-grade, and steel-producing countries were increasing output in anticipation of active trade.

These expectations were fulfilled well into the early summer, both as regards export trade and home trade in the leading countries. The appended table of European export prices partly illustrates the position in respect of international business. The European steel cartel, which controls quotas and prices, had little change early in the year.

However, demand from certain markets was so great that premiums, reaching in some cases as much as two gold pounds per ton, were freely offered



■ **Built in Western Siberia at the foot of a veritable mountain of iron ore the Stalin Metallurgical Works, at Kuznetsk, is a modern giant in steelworks. The view shows the administration building, in the background one of the giant blast furnaces. Sovfoto**

and accepted by Continental producers. As a result, at the beginning of the summer it was decided to integrate at least part of these premiums with the official prices, and this resulted in a general rise that took its full effect early in July.

British producers, guided by the British Iron and Steel federation, did not hasten to take advantage of the price situation. At that time, and throughout the year, the British home market was experiencing a period of exceptional activity, and the productive capacity of the country was called upon to meet the intensive demand caused by economic revival and an impressive program of rearmament: in fact, British blast furnaces and steelworks were unable to cope with domestic requirements, and the difference had to be made up from imports. To relieve the situation, import duties were reduced, import quotas were increased, and only tepid encouragement was given to raising prices outside the country. Nevertheless, it will be seen that British export prices were increased in May, but not to the same extent as was the case for Continental export prices.

By August, foreign markets began to show signs of fatigue, and the demand was less imperative. By the end of the month, premiums were still offered for early delivery, but much less lavishly than had been the case a few weeks earlier. Certain products, such as black and galvanized sheets, were already weak. The Continental demand from Great Britain, especially for semifinished steel and certain classes of rolled products, enabled Belgian and Luxemburg works to maintain a high rate of operations, but uneasiness was spreading as regards the future.

As the year drew to a close, Continental works mainly interested in export trade began to experience a lean time. Prices of controlled products, although officially maintained at the summer level, were cut by certain firms, generally not affiliated to the cartel. In brief, the situation, as compared with that prevailing at the beginning of the year, was reversed, and where premiums previously had been offered by buyers, now price concessions were offered by sellers. The cartel, however, decided to maintain its minimum prices and to curtail the quotas of raw steel allotted to its members for conversion into products for export.

British export prices remained firm, and demand from the British market continued good, an additional import quota of 75,000 tons of semifinished steel being, in fact, allocated to Continental producers for December.

A feature of export markets toward the later part of the year was the appearance of American competition, not only in distant markets, but also on the Continent and in Great Britain. American offers had the effect of weakening the market and were instrumental in bringing about price concessions on the part of Continental producers.

Late in November, however, a meeting of the European steel cartel was held in Paris, at which representatives of American steel interests were present, and an agreement was arrived at in regard to the prices of certain products, while it was agreed that the situation would be discussed again shortly with a view to arriving at an understanding of greater scope. Hopes of closer co-operation between American steel business and the cartel are now freely expressed.

It is the opinion generally that weakening of the European steel export trade was due, to a large extent, to developments in the Far East, and toward the end of the year, to economic reaction in America. On the whole, the influence of the steel cartel is considered to have been good.

Looking briefly over the home markets of the major steel-producing countries, as illustrated by the domestic price tables, an increase in British prices will be observed as having taken place in May. Considering the intensive demand and the rise in production costs, the increase was reasonable, and British users have the assurance, from the steel associations, that no further increase will take place in 1938.

Germany enjoyed active conditions at home, and, thanks to a rigidly controlled organization, the domestic prices of most steel products remained unaltered throughout the past year, and were, in fact, the same as in 1936.

Substantial rises, in several stages, will be noticed in Belgium, and still more so in France. Currency devaluation was largely the cause of these fluctuations, in addition to the considerable increase of production costs due to the application of new social legislation.

On the whole, 1937 may go down as a fairly good year, and definitely prosperous in the case of one or two nations. If there can be any hope of improvement in certain disturbed parts of the world, there is no apparent reason why 1938 should not also shine.

British Steel Breaks All Former Production Records

BY J. A. HORTON,
British Correspondent

■ DEVELOPMENT of the British steel industry took a further step forward in 1937. Gains in production, which had been a feature of the two previous years, were consolidated, and new high records were made in a year which was consistently prosperous month by month. It was inevitable that this prosperity should bring higher prices, but the rigid system of control checked any attempt to reach the high-water mark in values such as had been experienced in previous booms.

In the early part of the year the government launched a considerable armament program, involving consumption of heavy tonnages of metal. The influence of this scheme was widespread, not only in providing work for steel manufacturers, but for a variety of trades, the resources of which were brought into service with one definite aim.

Although there has been a tendency to exaggerate the effect of armament upon industry, there is no doubt it provided a fresh stimulus early in 1937, and in the opinion of those who are best able to judge, its influence will continue over the greater part of 1938. Obviously, it is impossible to forecast the day when reaction will set in, but it is admitted that it must come. In the meantime, steelmakers can afford to let the future take care of itself, for a while at any rate, knowing that present productive capacity is likely to be taxed to the utmost for many months. This does not mean that producers are devoting all their energies to armament work: on the contrary, there is considerable ordinary business, the development of which has been taking place in the last two or three years.

All-Time Record Set in Steel Production

The output of steel for the first ten months was 10,681,900 tons, the highest for that period ever attained in the British steel industry. The record monthly output was in September with 1,163,000 tons. The daily rate of pig iron production in September was higher than at any time since 1920. A net increase of six furnaces between June and the end of September gave the largest production of pig iron recorded since the post-war boom, and an all-time record for monthly output was established in October with 769,600 tons. Total output for the first ten months was 6,949,100 tons.

Fortunately for pig iron producers, the coke scarcity which caused considerable anxiety in 1936 was, to a great extent, overcome in the following year, and although prices continued on a high level, furnacemen have been able to enter into substantial contracts for deliveries of coke in 1938.

The number of furnaces in blast at the end of October was 133, compared with 113 in January, 1937, and 100 in January, 1936.

The question of production and the amount of scrap available for remelting resulted in a further link in the chain of control which now obtains in the British iron and steel trade. Early in the year, agreement was reached between the British Iron and Steel federation and the National Federation of Scrap Iron and Steel Merchants under which no scrap should be exported except by permission of the two bodies. Fixed prices were also announced for material used in steelworks, and an appeal was issued to the country generally in an endeavor to release any scrap metal which it was thought was being hoarded.

During the year, values of iron and steel in the British market were gradually increased, although, as already indicated, these advances were moderate in comparison with the expansion of industry. Toward the end of 1936, forge and foundry pig iron was advanced 6s a ton. Six months later pig iron producers advanced the price by £1 a ton, with a proviso that the new scale should operate until the end of the year, and the advance was based upon the higher cost of coke and a rise in railroad rates of 5 per cent.

It was not until November that the Foundry Pig Iron Producers' association introduced a loyalty rebate scheme similar to that prevailing in hematite and steel. A 5s advance on all iron with a phosphoric content of 0.75 per cent and over was declared, but this is returned in the form of a rebate to consumers who confine their purchases to British material. In effect, the price increase could be wiped out as far as many consumers were concerned but the introduction of the scheme was regarded as significant of the apprehension which pig iron producers felt in regard to possible importation of Continental iron.

Steady Prices Announced for All 1938

Finished steel prices moved up in line with the advance in raw material. New prices were announced May 1 showing an increase of £1 17s 6d in structural steel, and the new scale applied to all business transacted to the end of the year, thus affording the industry stability for eight months. The British Iron and Steel federation announced Nov. 9 that prices then prevailing for basic steel material would be maintained until the end of 1938.

As an indication of the desire of those in authority to avoid fluctuations likely to upset trading conditions, it may be added that the advance in steel prices previous to that effected in May had been

British Production Summary for 1937

(Gross tons 000 omitted)

	PRODUCTION				IMPORTS			EXPORTS		
Mo. ave.	Coal	Pig iron and ferro-alloys	Furnaces in blast‡	Steel ingots and castings	Iron ore	Pig iron and ferro-alloys	Steel†	Furnace coke	Pig iron and ferro-alloys	Steel†
1913	23,951	855	338	639	603	18.0	168	...	93.7	320
1934	18,394	498	96	738	363	13.6	100	115	11.1	*174
1935	*18,519	535	102	*822	379	10.7	85	132	13.2	*180
1936	19,044	643	110	982	496	25.9	98	120	9.3	174
1937										
Jan.	19,490	651	114	999	437	21.7	61.5	138	13.8	201
Feb.	19,797	604	115	996	514	26.2	56.7	141	13.5	187
Mar.	20,897	680	117	1,109	608	29.0	65.3	149	16.9	215
April	21,745	681	121	1,080	609	28.3	60.2	123	17.7	222
May	18,715	696	122	1,047	565	31.1	66.9	120	15.8	213
June	20,233	699	126	1,106	613	83.5	91.4	118	11.2	224
July	18,942	729	126	1,059	506	93.7	108.6	153	12.5	220
Aug.	18,231	714	130	988	573	99.2	114.2	177	14.2	187
Sept.	20,421	727	132	1,163	566	86.8	139.4	157	16.2	177
Oct.	20,372	770	133	1,690	598	66.2	154.3	153	10.6	196
Mo. av.	19,884	695	...	1,124	559	56.6	91.9	143	14.2	204

*Indicates corrections of previous figure.
†Includes iron castings, but scrap excluded.
‡Average for 1913. On last day of year or month for subsequent figures.

made in May, 1936, and in each case the changes had been made with the approval of the Import Duties Advisory committee. During the twelve months which elapsed between the two adjustments, the cost of raw materials had risen beyond anything which could have been foreseen. Foreign ore had gone up by 50 per cent, coke by 36 per cent and scrap by 20 per cent.

Owing to the tension in the industry at the beginning of the second half, the Import Duties Advisory committee came to the conclusion that it was necessary to reduce the duty on iron and steel imports. It was obvious at that time that British productive resources were inadequate to deal with the exceptionally heavy strain that was being placed upon them. There were many instances of rerollers' works being at a standstill owing to lack of such material as soft billets and sheet bars. In addition, many industrialists were clamoring for finished steel for constructional purposes.

The decision to reduce the duties was welcomed by users throughout the country as the only means of overcoming a shortage that was rapidly becoming more acute. During the last quarter there was a considerable easing of the position in regard to supplies of semifinished steel. Regular working again became possible in the rerolling mills, and it is expected that this improvement in the matter of Continental supplies will continue, in view of the fact that Belgian and French producers are more inclined to consider exports to Great Britain.

Britain's exports of iron and steel for the first ten months of 1937 were something like 35 per cent ahead of those of the corresponding period of 1936 on a value basis. A tonnage of 1,807,988 tons realized £29,477,989 in 1936: 2,183,760 tons realized £35,955,546 in 1937. The best markets were within the British Empire. Canada took a leading place, and South Africa was also a steady buyer, as she has been for many years past.

With a reduction in import duties it was natural that there should be a considerable increase in imports, not only in semifinished but in finished steel. The third quarter's figure was 477,445 tons, against 348,873 tons in the second quarter and 373,473 tons in the first quarter. Imports in the first ten months amounted to 1,482,462 tons, compared with 1,298,352 tons in the corresponding period of 1931. The chief sources of supply were the United States, Canada and Belgium.

A large production of steel necessitated greater imports of steel scrap, and a considerable increase took place in 1937 as compared with the previous year, material being brought in substantial quantities from

European Iron and Steel Export Prices, 1937

F.O.B. Ports of Shipment

BRITISH PRICES IN POUNDS STERLING, PER GROSS TON

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
Pig Iron												
Foundry, No. 3, Middlesbrough	3-18-6	3-18-6	3-18-6	5- 0-0	5-15-0	6- 0-0	6- 0-0	6- 0-0	6- 0-0	6- 0-0	6- 0-0	6- 0-0
Hematite, East Coast	4-10-0	4-10-0	4-15-0	5-10-0	6- 5-0	7- 0-0	7- 5-0	7- 5-0	7- 5-0	7- 5-0	7- 5-0	7- 5-0
Semifinished Steel												
Billets	6- 5-0	6- 5-0	6- 5-0	6- 5-0	7-17-6	7-17-6	7-17-6	7-17-6	7-17-6	7-17-6	7-17-6	7-17-6
Wire rods	9-12-6	9-12-6	9-12-6	9-12-6	10- 0-0	10-16-6	10-16-6	10-16-6	10-16-6	10-16-6	10-16-6	10-16-6
Finished Steel												
Standard rails	8- 5-0	8- 7-6	8-12-6	8-15-0	9- 0-0	10- 2-6	10- 2-6	10- 2-6	10- 2-6	10- 2-6	10- 2-6	10- 2-6
Merchant bars	9- 0-0	9- 5-0	9-10-0	10- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0	12- 5-0	12- 5-0
Structural shapes	8-10-0	9- 2-6	9- 2-6	9-12-6	10-12-6	10-12-6	10-12-6	10-12-6	10-12-6	10-12-6	10-12-6	10-12-6
Plates, ship, bridge and tank	9-12-6	10- 3-9	10- 3-9	10-15-0	11-11-3	11-11-3	11-11-3	11-11-3	11-11-3	11-11-3	11-11-3	11-11-3
Sheets, black, 24-gage	11-15-0	12- 5-0	13- 0-0	13- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0
Sheets, galvanized, 24-gage, corrugated	14- 0-0	15- 0-0	16- 0-0	16-15-0	18-15-0	18-15-0	18-15-0	18-15-0	18-15-0	18-15-0	18-15-0	18-15-0
Hoops and bands	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	13-15-0	13-15-0	13-15-0	13-15-0	13-15-0	13-15-0	13-15-0
Plain wire, base	10-10-0	10-10-0	10-15-0	11- 0-0	11- 0-0	14- 0-0	14-10-0	19- 0-0	19-10-0	19-10-0	19-10-0	19-10-0
Galvanized wire, base	12-10-0	12-10-0	12-10-0	14-10-0	14-10-0	16-10-0	17- 0-0	20- 5-0	23- 5-0	23- 5-0	23- 5-0	23- 5-0
Wire nails, base	12- 0-0	12- 0-0	12- 0-0	14- 0-0	14- 0-0	16- 0-0	16-10-0	18-10-0	18-10-0	18-10-0	18-10-0	18-10-0
Tinplate, base box 108 pounds	19-9	19-9	1- 0-6	1- 4-6	1- 4-6	1- 4-6	1- 5-0	1- 5-0	1- 6-0	1- 6-0	1- 3-6	1- 3-3
Ferromanganese — delivered Atlantic seaboard, duty-paid	$80	$80	$90	$95	$95	$102.50	$102.50	$102.50	$102.50	$102.50	$102.50	$102.50

CONTINENTAL PRICES IN GOLD POUNDS, PER METRIC TON

F.O.B. Channel or Northern Seaports

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
Pig Iron												
Foundry, silicon 2.50-3.00	2- 2-6	2- 5-0	3- 2-6	3-10-0	3-19-0	4- 1-0	3-19-0	3- 6-0	3- 0-0	2-15-0	2-13-0	2-14-0
Basic bessemer	1-15-0	1-15-0	2-10-0	2-15-0	3-15-0	3-17-0	3-15-0	3- 2-6	2-19-0	2-12-0	2-12-0	2-12-0
Semifinished Steel												
Billets	3- 0-0	3- 0-0	3- 7-0	4- 7-6	4- 7-6	4- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6
Wire rods	5- 2-6	5- 2-6	6- 0-0	6- 0-0	7- 0-0	7- 0-0	6-10-0	6-10-0	6- 2-6	6- 2-6	6- 2-6	6- 0-0
Finished Steel												
Standard rails	6- 0-0	6- 0-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0	5-15-0
Merchant bars	3-18-9	4- 0-0	5- 0-0	5- 0-0	5- 0-0	5- 0-0	6- 0-0	6- 0-0	6- 0-0	6- 0-0	6- 0-0	6- 0-0
Structural shapes	3-18-0	4- 0-0	4-17-6	4-17-6	4-17-6	4-17-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6	5- 7-6
Plates, 5 millimeters	4-12-6	5-10-0	5-15-0	6- 2-6	6- 2-6	6- 2-6	7- 2-6	7- 2-6	7- 2-6	7- 2-6	7- 2-6	7- 2-6
Sheets, black, 24-gage, close-annealed	7- 0-0	7- 5-0	7-15-0	7-15-0	8-10-0	8-10-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0
Sheets, galvanized, 24-gage, corrugated	8-15-0	9- 5-0	9-15-0	10- 0-0	12- 0-0	12- 0-0	11-10-0	11- 7-6	11- 0-0	11- 0-0	11- 0-0	11- 0-0
Hoops and bands	4-15-0	5- 0-0	6- 0-0	6- 7-6	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0
Plain wire, base	6-15-0	6-15-0	7- 0-0	7-10-0	7-10-0	7-10-0	7- 0-0	7- 0-0	7- 0-0	7- 0-0	7- 0-0	7- 0-0
Galvanized wire, base	7-17-6	7-17-6	8- 0-0	8- 0-0	8- 0-0	8- 0-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0	8-15-0
Wire nails, base	6-10-0	6-10-0	8-10-0	8-10-0	8-10-0	8-10-0	8- 0-0	8- 0-0	8- 0-0	8- 0-0	8- 0-0	8- 0-0

the United States, Sweden and Algeria. Exports of scrap show a diminishing tendency, as is only to be expected in view of the heavy call by steelmakers.

The decision of the nine steel associations, based on the recommendations of the British Iron and Steel federation, to keep prices at the present level until the end of 1938 will have far-reaching effects on the industries of the country as a whole, and its importance cannot be exaggerated. It was not achieved without opposition, in view of the steep rise in costs of production, but, as noted in the official statement, "this policy has been framed with the purpose of ensuring a period of general and prolonged stability."

That steelmakers should be willing to shoulder the burden of increasing costs of production is a clear indication that British producers are hoping that better organization, a process which has been going on for some years, will enable them to keep prices at the present level and overcome increased costs of production by the healthier method of bigger sales. In addition, they are hopeful of securing relief in regard to freight charges and cost of coke.

The improvement in the shipbuilding trade of Britain continued throughout 1937. It has not been without its setbacks, but it is satisfactory to note that the latest figures show that of the total tonnage under construction throughout the world, 40.8 per cent is being dealt with in Great Britain and Ireland.

Work on warships will keep some yards busy well into 1940, but the builders are still capable of dealing with more orders for merchant ships. In October the Clyde registered its highest launching output since September, 1934. During that month no less than 11 vessels were put into the water, representing over 50,000 tons. In that area alone some of the admiralty orders on hand will take two or three years to complete. In ten months Scottish shipbuilders launched 118 vessels, aggregating 357,000 tons.

Disturbances in the East and in Europe cannot be overlooked in any consideration of the trade situation. It has a sobering effect upon the prophets who are seeking to forecast the trade outlook for 1938.

French Production Summary for 1937

(Metric tons 000 omitted)

	PRODUCTION*					IMPORTS¶			EXPORTS¶	
Mo. ave.	Iron ore	Coke†	Pig iron and ferro-alloys	Furnaces in blast‡	Steel ingots & castings	Coke	Pig iron and ferro-alloys	Steel§	Pig iron and ferro-alloys	Steel§
1913	3,588	336	756	195	581	256	4.2	10.0	9.0	51
1934	2,668	342	514	86	514	183	5.1	11.4	14.0	253
1935	2,671	324	482	81	523	178	4.9	10.0	14.0	184
1937										
Jan.	2,980	329	591	90	608	260	4.0	12.0	22.0	134
Feb.	2,770	319	574	93	624	310	5.0	8.0	25.0	116
March	3,085	368	649	96	679	285	4.2	11.0	27.0	111
1936	2,767	327	519	83	559	213	5.8	7.7	13.5	149
April	3,318	362	654	99	684	313	6.0	11.0	36.0	125
May	2,861	364	666	102	651	379	3.4	8.0	34.0	126
June	3,041	366	685	105	687	325	4.4	11.0	44.0	172
July	3,135	349	699	107	685	318	2.1	9.0	39.0	164
Aug.	2,838	321	645	106	559	354	2.1	6.0	33.0	131
Sept.	3,214	349	635	106	672	322	2.1	5.0	34.0	127
Oct.	3,513	375	705	107	703	309	3.2	4.0	45.0	146
Mo. av.	3,075	350	655	107	655	317	3.6	8.5	33.9	135

*Production for 1913 is for France in her present boundaries.

†Coke production at the coal mines. In addition, the iron and steel works produce about 3,000,000 tons annually.

‡On last day of year, or month.

§Includes ingots, semifinished steel, all rolled products, forgings and scrap.

¶Import and export figures are inclusive of the Saar district for 1934.

French Social Legislation Interferes with Production

BY LEON JAUDOIN,
French Correspondent

■ FRANCE appears to have remained behind other European countries in regard to iron and steel activities during 1937. Although it can be expected that the output of steel ingots and castings for the whole year will be about one million metric tons more than for 1936, reaching almost 8,000,000 tons, this output of steel will be some two million tons below the record attained in 1929. Furthermore, whereas the other major European countries have already made considerable advances during the past three years, France has only increased her production in comparatively small stages.

To explain this, it is necessary to understand something of the social, political and financial problems that have beset France during the year, as these have had a considerable influence on French industry and commerce.

It has already been reported in these columns that a series of social laws were passed early in the year by the Blum government, which made it compulsory to establish a 40-hour week and two weeks' paid holiday. Industrialists found considerable difficulty in applying this new legislation, and the workers, in their impatience to obtain the immediate application of the laws that were in their favor, went on strike while negotiations were being carried on with the employers, these strikes lasting throughout the early part of the summer and considerably hampering production.

New Labor Laws Hamper Progress

From the end of the summer until the regional elections which took place in October, the situation became more normal and production was resumed without too many interruptions, although the new laws were being applied. However, the position became worse again toward the end of the year, because the new legislation occasioned a considerable rise in costs of production, not only in the iron and steel industry, but in the whole economic system of France, and as a result of the concurrent rise in the cost of living, demands for higher salaries and wages became more and more insistent, bringing about the usual vicious circle.

Apparently the French steel industry did not benefit greatly from the devaluation of the franc, which took place in two stages during the year. On the one hand, this devaluation brought about an increase in the cost of imported raw materials, and the French steel industry was not able to take advantage of the lower value of the franc in exporting its products, because it was unable to produce sufficiently to meet requirements of the domestic market and at the same time to take its full share in export markets in competition with other countries.

The application of the 40-hour week to French industry was all the more difficult inasmuch as the nation suffers from lack of skilled workmen. Furthermore, increased costs arising from the new legislation resulted in a considerable decrease in the profit available from the operations of the works. For the coal mines alone it is estimated that the

40-hour week has brought about an increase of one billion francs in costs for the whole year: this, with the slowing down of production, necessitated an increase in imports of foreign coal, which itself means an increase in production costs for the consuming industries.

At the beginning of the year the domestic market was quite active. The revival of demand was mainly due to the necessity of replenishing depleted stocks and to the large orders placed by the state for rearmament and national equipment purposes. This rather intense activity had a certain artificial character, and gradually it died down, reaching its lowest point about late summer, and the expected resumption of business at the beginning of the fall did not take place, one of the reasons for this being that many industrial concerns did not have sufficient working capital to launch into large ventures.

During the first nine months the output of steel ingots and castings in France was 5,839,000 metric tons, compared with 4,904,000 tons in the corresponding period of 1936, and for pig iron the figures were 5,850,000 tons and 4,576,000 tons respectively. At the end of September 106 blast furnaces were operating, against 90 at the beginning of the year. The production of rolled products controlled by the comptoir during the first seven months was as follows:—

OUTPUT OF CARTEL CONTROLLED PRODUCTS

FIRST SEVEN MONTHS

Metric Tons

	1936	1937
Semifinished steel	464,000	495,000
Structural steel	271,000	292,000
Merchant steel	630,000	826,000
Rails	132,000	156,000
Plates	114,000	138,000
Medium-gage sheets	65,000	91,000

Owing mainly to difficulties in production schedules due to the new working hours, deliveries were generally extended over long periods, which in many cases caused users to complain. The following figures, giving the volume of orders booked by the leading comptoirs, illustrate activities in conjunction with the various syndicated products, both as regards domestic and export trade:—

ORDERS BOOKED BY THE LEADING COMPTOIRS

Metric Tons

	Mo. ave.		Mo. ave. 1st qtr.	Mo. ave. 2nd qtr.	July	Aug.	Sept.
	1935	1936	1937	1937	1937	1937	1937
Semifinished steel							
Domestic	10,000	19,400	30,175	28,207	8,334	23,855	24,159
Export	21,000	29,200	29,900	19,713	35,920	45,104	38,400
Structural shapes							
Domestic	14,500	20,550	20,200	16,366	12,713	12,240	12,295
Export	15,000	16,450	14,600	12,643	7,609	8,135	13,870
Merchant bars							
Domestic	55,000	77,500	87,900	65,796	73,795	60,422	70,655
Export	15,000	20,550	29,900	28,946	16,041	7,253	8,100

The various comptoirs functioned normally during 1937, and in addition to existing bodies, a syndicate for skelp and one for spring steel were organized. The main feature in connection with the organization of the steel trade was the setting up of a syndicate for steel merchants. This syndicate is established on the following principles: France is divided into a certain number of economic regions, and in each of these regions the merchants operating therein are grouped, forming regional syndicates; prices of the syndicated products are fixed on an f.o.b. warehouse basis, and each merchant can dispose of a certain quota of steel which he is not to exceed; two different systems of control are exerted according as to whether the firm is a small one or one of importance. It would appear that since this organization started to function, the results have been satisfactory from the point of view of the trade.

One group of products was not syndicated until late in the year: that of light-gage sheets, both black and galvanized. This was due to the exigencies of a small number of firms. However, the basis of the proposed syndicate was established in the last week of November. From the point of view of the ultimate consumer, the organization of the comptoirs does not seem to be regarded with much favor. Lack of competition tends to dry up the spirit of enterprise, and users complain of not being able to deal direct with the suppliers with whom they were accustomed to do business, and also that the system lacks elasticity.

In the domestic market, substantial increases took place in prices owing to the rise in social charges and taxation, and devaluation of the franc, which had for effect an increase in the cost of imported raw materials. Prices were also increased owing to the new tax on production which replaced the turnover tax. The turnover tax formerly was charged against each individual transaction: now the tax on production is charged against the final transaction, and amounts to 8 per cent.

As an illustration of the increase in iron and steel prices: Foundry pig iron was hold at 336 French francs at the beginning of the year and at 554 francs Oct. 1; hematite pig iron increased from 540 francs at the beginning of the year to 869 francs Oct. 1; billets were quoted at 590 francs on Jan. 1 and at 757.50 francs Oct. 1. During the same period the price of beams rose from 780 francs to 970 francs, that of merchant bars from 800 francs to 995 francs, the price of hoops from 915 francs to 1120 francs, the basic price of plates from 1001 francs to 1240 francs, and the basic price of light-gage sheets from 1300 francs to 1500 francs. Account must be taken of the devaluation of the franc in viewing these increases.

Export Trade Shows Heavy Gain

Domestic trade was stimulated by the constant anxiety on the part of consumers concerning possible further price increases and also owing to the requirements of the rearmament program. It is worth noting that normal industrial requirements did not create much demand, particularly as regards construction work.

Owing to revival of world demand for all kinds of iron and steel products, the volume of export trade was higher than in 1936, and for the first nine months exports of pig iron reached 294,000 metric tons, against 99,000 tons in the corresponding period of 1936. Exports of rolled products during the period showed an increase from 919,800 metric tons in 1936 to 1,113,300 tons in 1937. Exports of scrap, on the other hand, decreased from 367,000 metric tons to 94,000 tons.

Exports of products controlled by the Comptoir Siderurgique were fixed in tonnage and in price by the decisions of the international steel cartel, but owing to the reduction of French output already referred to, French works were not in a position to book all the contracts to which they were entitled, especially during the first part of the year, for semi-

finished steel and for structural steel shapes as well.

Exports of merchant steel during the first two quarters were substantial, but during the second half the volume of exports of these products showed a marked reduction. This was partly compensated by the high tonnage of semifinished steel exported to Great Britain. For August alone, 45,000 tons of semifinished products were booked, the greater part being for Great Britain. The monthly average of semifinished steel exports in 1936 was only 29,000 tons.

A feature of the year was the nationalization of parts of certain important industrial concerns insofar as aviation and armament work was concerned. The outlook remains uncertain, but there is reason to believe that the extremist attitude taken by the socialist government at the beginning of the year will have the effect of bringing back the country to a more normal attitude.

Promising Belgian Outlook Fades as Year Closes

European Staff Special

■ AT THE beginning of the year, Belgian and Luxemburg iron and steel works had well-filled order books, particularly for export, and orders contined to be taken for several months. Eventually demand was such that premiums were offered, which in certain cases reached as much as £2 or £3 (gold) per ton. The domestic market was quieter. The volume of orders coming in at the beginning of the year caused at certain times a number of works to retire from the market and deliveries were extended to five months, especially as regards light-gage sheets.

The situation was rendered difficult by the fact that the abnormal demand made it necessary to resort to a policy of rationing, and certain markets, like Palestine and Egypt, suffered from this state of affairs. One of the largest buyers during the early part of the year was Japan, particularly in respect of semifinished steel and merchant bars, but certain difficulties in regard to payment were encountered, and eventually Japan transferred some of its business to the United States and to Canada.

In order to meet the constantly growing demand at the beginning of the year, certain works in Belgium started up additional stacks and steel furnaces.

About the middle of the summer a noticeable drop in volume of demand became evident. This was partly due to the effects of the war between China and Japan, which made it impossible to deliver at Chinese ports, particularly as regards North China: as a result, a substantial portion of the orders booked had to be canceled, and at the end of the summer delivery periods were reduced to between two and three months.

Throughout the year, Great Britain was an important buyer of semifinished products. In order to meet the world demand, it would have been necessary for Belgian and Luxemburg works considerably to increase their production, but they were hampered by the difficulty of obtaining raw materials, and the situation became so critical that the whole question was brought before the government. At the time, a number of transforming works were compelled to work part time, due to lack of raw and semifinished materials, and in order to relieve the position it was even proposed to import such materials from Russia.

The ore situation also was difficult. On the one hand, a large portion of Belgium's iron ore is imported from France, and that country required most of its output for its own requirements. A large proportion of the iron ore used by Belgium also originates from Spain, and the revolution in that country resulted in greatly restricted deliveries.

The output of Belgian coal mines was insufficient to meet the country's requirements without the assistance of foreign labor, which was supplied in part by Polish miners. Another difficult problem was the supply of scrap, and measures had to be taken to restrict exports of this material.

Labor Problems a Deterrent

Belgium was also faced with difficulties in connection with labor, which put forward various demands for wage increases. An increase of 2½ per cent was granted at the beginning of the year, followed by a further similar increase about Aug. 15. There was an insistent demand for a 40-hour week, and certain concessions had to be made in that direction.

Toward the end of the summer conditions deteriorated and the market, which had almost been operating under boom conditions during the first half, began to show signs of depression. Fortunately, a considerable backlog tonnage enabled producers to continue to operate almost at full rate until late in the year, but it was difficult to maintain prices at the high level that had prevailed during the first half.

Taking a general view, conditions in the Belgian and Luxemburg iron and steel industry during 1937 were, on the whole, satisfactory for the greater part of the year. The output of steel ingots and castings in Belgium during the first ten months was 3,287,420 metric tons, against 2,596,263 tons in the corresponding period of 1936. For Luxemburg the figures were 2,172,400 tons and 1,618,730 tons respectively. However, a number of concerns had to contend with difficulties in regard to their financial situation, since the rapid rise in costs of production

Belgian-Luxemburg Production in 1937

IN 1937
(Metric tons 000 omitted)

	PRODUCTION					IMPORTS Belgium and Luxemburg		EXPORTS Belgium and Luxemburg	
		Belgium		Luxemburg					
Mo. ave.	Coke	Pig iron and ferro-alloys	Steel ingots and castings	Pig iron and ferro-alloys	Steel ingots and castings	Pig iron	Steel‡	Pig iron	Steel‡
1913	294	207	206	212	98	48*	26*	1.4*	130*
1934	353	246	245	163	161	18	19	3.6	304
1935	370†	252†	252	156	153†	17	13	3.5	298
1936	423	267	265	166	165	23	19	5.2	303
1937									
Jan.	450	286	286	205	205	32	12	3.3	317
Feb.	423	267	269	198	203	25	16	2.3	291
March	478	309	309	220	225	24	17	3.2	369
April	465	320	328	223	230	25	20	3.0	356
May	485	336	330	229	224	28	23	3.0	361
June	518	341	349	231	237	33	22	3.3	428
July	505	344	356	226	221	35	30	3.4	377
Aug.	518	350	355	221	215	22	22	3.7	350
Sept.	511	340	353	213	214	20	26	3.8	430
Oct.	533	350	354	204	198	19	17	4.0	341
Mo. av.	489	324	329	217	217	27	20	3.2	349

*Belgium only.
†Corrected figures.
‡Includes iron castings and scrap.

depleted their reserves and forced a number of them to increase their working capital by means of debentures or increases of capital. As the year came to an end, the outlook became less and less favorable, not only as regards domestic trade, but also in respect of export trade, because while during the year 1937 Great Britain took only a relatively small share of business in export markets, it is realized that the British steel industry has made great strides in improving its equipment and its general organization, and it is felt that as the world demand begins to drop, British steelmakers are in a stronger position to compete against Belgium and Luxemburg in export markets.

The tendency in Belgium at present is to modernize and re-equip existing works in order to face foreign competition. Furthermore, with a view to stimulating domestic trade, and apart from the rearmament schemes, a program of public works, covering improvements to the principal harbors and railroads, will probably be a feature of 1938, but, generally speaking, the prospects for the coming year remain uncertain.

Raw Material Problem Is Obstacle to German Steel

BY DR. HANS HARTIG,
Berlin

■ ALTHOUGH the production achieved by the German metallurgical industry in 1936, with 19.2 million tons of raw steel, had already exceeded the pre-war figure by 1½ million tons, notwithstanding the loss of the Lorraine and Eastern Upper-Silesian mines and steelworks, the upward trend of the German mining industry has not yet reached its highest point.

German production of iron ore, which in the last pre-war year, owing to the rich Lorraine yields, amounted to approximately 36 million tons, has shown steadily rising figures of ore mined since its lowest stand in 1932. With an estimated output of 8½ million to 9 million tons in 1937, the German production of iron ore should show an increase of from 1½ million to 2 million tons in comparison with the 6¾ million tons recorded in the previous year, 1936. In this increase, the most intensive utilization of Germany's own low-grade iron ore, as prescribed within the scope of the second Four-Year Plan, is as yet reflected only in a relatively small measure.

The opening of the South German "Dogger" and the North German "Salzgitter" ore deposits had not yet progressed far enough to allow any expectation of important quantities being mined and supplied to German blast furnaces in the past year. In 1938, however, considerable quantities will already be available to the German blast furnaces, where preparations are now being made for their reception. In this connection it may also be stated that other ore deposits, which are favorably situated and have been known for a long time, such as those of Porta, near Minden on the Weser, for the mining of which a new company has been formed with the assistance of West German iron industries, are to be worked on an intensified scale.

While production in the iron and steel industry itself, owing to difficulties connected with raw materials, did not, in fact, continue to increase in 1937 at so rapid a rate as in preceding years, it is estimated that raw steel production will approximate 19,500,000 metric tons, and pig iron output 15,800,000 tons, showing increases of about 300,000 tons for steel and 500,000 tons for pig iron.

As stated above, the slower rate of increase experienced in the production of the German iron industry is not due to any falling off in the demand, but solely to a world-wide shortage of raw materials. The troublous situation in Spain has resulted in a practical stoppage of all ore supplies from that country to Germany. The German iron and steel industry was also unable to obtain from France and North Africa the quantities of ore which used to be placed at its disposal from those countries when conditions were generally favorable.

Quota System for German Steel

Moreover, German demand for iron and steel material in 1937 increased so much from various causes, such as the new industries created under the provisions of the Four-Year Plan, German rearmament, a larger demand resulting from the increased maintenance and replacement requirements of the German industrial equipment (caused by increased output), forced mechanization, building, plans for the construction of sports fields and roads, etc., that it could be satisfied only in part.

By the spring of 1937, demand had assumed such proportions that a quota system for the most important consumers had to be set up. Thus, the public services were allotted definite monthly consumption quotas of iron and steel material. In the same way, the most important private consumers of iron and steel, such as engineering works, shipbuilding yards, motor-car manufacturers, mines and foundries, had their consumption regulated by the allotment of quotas.

Other industries had at first to fall back upon the "free" market, but when it proved increasingly difficult for them to obtain their supplies outside the quota system, most of these industries were granted so-called "Verschleiss" (replacement) quotas, the allotment of which is entrusted to the organization

German Production Summary for 1937

(Metric tons 000 omitted)

Mo. ave.	PRODUCTION* Coke	PRODUCTION* Pig iron and ferro-alloys	PRODUCTION* Furnaces in blast†	PRODUCTION* Steel ingots and castings	IMPORTS‡ Pig iron and ferro-alloys	IMPORTS‡ Steel§	EXPORTS‡ Coke	EXPORTS‡ Pig iron and ferro-alloys	EXPORTS‡ Steel§
1913	2,639	1,024	225	1,166	11.0	41	534	71.0	470
1934	2,040	728	73	993	7.7	151	514	13.8	200
1935	2,463	1,070	108	1,370	8.2	68	550	19.1	249
1936	2,988	1,275	114	1,601	11.5	59	599	22.1	284
1937									
Jan.	3,349	1,292	115	1,534	13.0	53	697	7.4	301
Feb.	3,037	1,191	115	1,520	18.4	68	663	11.3	277
March	3,416	1,301	113	1,582	13.2	54	787	12.3	314
April	3,331	1,306	115	1,645	8.0	56	816	10.0	297
May	3,428	1,313	114	1,608	5.8	68	784	10.3	284
June	3,363	1,304	118	1,659	7.1	70	731	9.7	357
July	3,464	1,345	119	1,657	8.8	75	786	13.5	379
Aug.	3,487	1,362	119	1,663	11.6	73	813	13.9	295
Sept.	3,400	1,349	124	1,690	16.4	76	735	8.2	267
Oct.	3,554	1,418	125	1,714	16.7	112	690	6.9	273
Mo. av.	3,383	1,318	...	1,629	11.9	70	759	10.3	304

*Figures for 1913 are for Germany in her present boundaries; figures for 1934 do not include the Saar.
†On last day of year, or month.
‡Figures for 1913 are for pre-war boundaries and include Luxemburg. The returns for 1934 do not comprise the Saar.
§Includes iron castings and scrap.

responsible for the management of the industry, i.e. to the various trade groups. These quotas are intended (as, indeed, the term "Verschleiss" implies) merely to cover the consumption of the manufacturing plants worked by the industrial groups concerned. As regards direct and indirect exports of iron and steel, the requisite quantities are to be made available by way of "preference," special attention being given to indirect exportation because this is more remunerative and brings in more foreign exchange than direct exports.

The iron and steel shortage, which was felt in an ever increasing degree during 1937 in Germany and found public expression in the slogan, "Steel matters more than gold," eventually led to the state-aided formation of the "Reichswerke A.G. fur Erzbergbau und Eisenhutten Hermann Goring," with headquarters in Berlin. In view of the fact that the quantities of ore available on the world market, together with the iron ore mined in Germany in the previous year, and the scrap available in the country, proved inadequate to cover requirements of the iron and steel industry, the head of the Four-Year Plan, General Goring, decided to form the new mining and ironworks company bearing his name.

To Open New Ore Deposits

Its first objective is the large-scale opening-up of the so-called "Salzgitter" and "Dogger" ore deposits to be found at the foot of the Harz mountains, as also in Franconia and in Baden (south), as well as the erection of a vast smelting plant at Bleckenstedt, near Brunswick. This smelting plant, for the construction of which contracts have already been placed, is to be linked up by a new canal (15 kilometers long) with the Mittelland canal, along which coal is to be shipped from the west (Ruhr) and ore brought from the opposite direction.

As the problem of smelting low-grade iron ores by the acid process, in which desulphurization takes place after tapping the furnace by the addition of sodium carbonate, may be regarded as having been solved both technically and from the economic point of view, rapid construction of the plant, which should begin operation by 1940, is to be expected. In 1938, already several million tons of "Salzgitter" ore will be forwarded via the Mittelland canal to the blast-furnaces on the Rhine and in the Ruhr.

The Salzgitter ores, deposits of which are estimated to contain one thousand million tons, will be worked partly by quarrying, partly by mining. At first, pending the sinking of shafts, quarrying will be the principal means of obtaining the ore, so as to accelerate as much as possible the rate of German iron and steel production and to ease the stringency prevailing on the German iron market.

As regards pig iron, the formation of the Reichswerke A.G. fur Erzbergbau und Eisenhutten Hermann Goring was preceded by a reconstruction of the Vereinigte Oberschlesische Huttenwerke A.G., Gleiwitz, from a public into a private company by the transfer of its state-owned stock to the Castellengo-Abwehr Mining company of Gleiwitz.

So that the cost of foreign pig iron, which is in itself much dearer than the home product and on the importation of which the foundries have to rely, should not be made still more expensive, the German duty on pig iron was lowered from RM. 10 to RM. 1 for the period from Oct. 18, 1937 to Oct. 31, 1938.

For the purpose of regulating supplies of scrap to German smelting plants, it is contemplated forming a special organization, i.e. the Vereinigung der Westdeutschen Schrottverbraucher G.m.b.H., which will not only look after the buying of scrap for all the plants using west German scrap, but will also be responsible for finding sources of supplies and for the proper distribution of the material. Moreover, Germany also participates in the international scrap buyers' cartel, which has been in operation for one year. The distribution of the quantities of foreign scrap imported into Germany through this cartel devolves upon a central office covering the whole of Germany.

To sum up, it may be stated that in 1937 the German mining industry was successful in its efforts to achieve progress both at home and in the international sphere. On the national side, it will, undoubtedly, widen and strengthen its position as regards raw materials, not least by the adoption of new processes, and thereby also further increase its production. In the international field it has secured for itself, by co-operation with well-established international cartels of many years' standing and by participation in new international agreements, a share in the fruitful relations between various national economic units, the development and strengthening of which it will continue to foster as heretofore.

Central European Steel Trade Continues Progress

BY DR. JAN TILLE,
Special Correspondent

■ STEEL PRODUCTION in the various countries of central Europe was not uniform throughout 1937, some countries showing comparatively small increases, while others attained record figures. However, the situation on the whole was favorable, although the development had all the typical signs of a quantity boom and not a profit boom.

Czechoslovak steelworks increased production considerably and are now working practically to capacity. In the first nine months they produced 1,705,765 metric tons of raw steel, equivalent to an annual production of 2,275,000 tons, 42 per cent more than in 1936. This output is an all-time record for Czechoslovakia, as it exceeds the previous record of 1929, at 2,145,350 tons. The relation between steel sold for home consumption and for export was practically unchanged compared with 1936, exported steel accounting for 18 per cent of the total sales. An increase in export trade was impossible, as it was necessary to give first consideration to enlarged domestic requirements. Considering the situation in the world market, where prices in general have risen above Czechoslovak domestic prices, there was almost a complete abolition of premiums granted to inland manufacturers for their export business.

Deliveries for this so-called "indirect exportation" amounted to about 8 per cent of the total trade. Increased sales in Czechoslovakia were caused only to a very small extent by deliveries for armament pur-

poses, and the active conditions prevailing were characteristic of a really improved situation in the home market, which fact is also evident from the great reduction in unemployment.

In rolled products Czechoslovakia not only had a record production, but probably also a world record for stability of prices, as the latter have remained unchanged since November, 1931, that is, during both the depression and the boom periods, although in the latter period wages were increased by 5 per cent. Pig iron prices were raised, as prices for this material had remained far below the world level, which began to rise in 1936.

The credits granted to Soviet Russia, through Czechoslovak banks and industrial concerns, to finance Russian purchases of steel products, were fully exhausted and not renewed. Trade with Soviet Russia practically ceased, except for a few insignificant deliveries.

Owing to intensified production, importation of iron ore into Czechoslovakia increased, the main source being Sweden, although Austria, Yugoslavia and Russia contributed and Bulgaria supplied small quantities.

The participation of Czechoslovakia in the IRMA (international railmakers' association), in which Czechoslovakia and Austria form one unit, the Czechoslovak-Austrian group, underwent no change. With regard to the international steel cartel, in which Czechoslovakia was interested only in the sales office for plates and medium gage sheets, Czechoslovakia now participates in all the selling offices, including merchant bars, hoops and bands, black and galvanized sheets, structural steel, with the exception of the selling office for semifinished products. Czechoslovakia also participates in the International Scrap Convention, of which Austria, Hungary and Poland are members.

In 1937, raw steel production increased most in Austria, where the increase over the previous year amounted to nearly 48 per cent. Production in the first half of 1937 was 309,600 metric tons, compared with 210,000 tons in the corresponding period of 1936. The output and exportation of iron ore in Styria also showed an increase and amounted to 3,000,000 metric tons in 1937, or 200,000 tons more than in 1936.

Smaller Nations Make Increase

Hungary has the relatively smallest increase in the production of raw steel, the figure being only 8½ per cent. The works in this country, however, are operating almost to capacity. In the first half of 1937, the production exceeded 300,000 metric tons, against 276,500 tons in the corresponding period of the previous year. Hungary is an individual member of the IRMA.

Negotiations between the international steel cartel and Austria and Hungary, with a view to these two countries joining the cartel, have not yet produced any definite result. During the past year, iron and steel prices in these two countries remained unchanged.

Production of raw steel in Poland showed an increase of 19 per cent in 1937, compared with 1936. In the first half of the year, 677,000 metric tons were produced, against 570,500 tons in the same period of the preceding year. At the end of the 1934 depression the government had intervened to bring about a reduction in steel prices. During 1938 these prices were brought back to their original level. Steel production in Poland would have been greater if there had been no difficulties in procuring raw materials. Not only lack of raw materials in the world market, but also difficulties in obtaining sufficient foreign currencies caused the unfavorable situation, and this applies to purchases of both iron ore and scrap.

Activities in Soviet Russia continued on a large scale as regards domestic output. However, although the production of raw steel in 1937 will probably be at least one million metric tons more than in 1936, this will not be sufficient to attain the output planned for the year, which was about 20 million tons. The same remark applies to pig iron, the production of which was little above that of 1936.

The most striking feature about Russia's activities in iron and steel markets during the year was the very substantial decline of exports, especially as regards pig iron. Russia has thereby lost the first place which she occupied in 1936 as the leading exporter of pig iron in the world, and now has receded behind other countries.

Italian Steel Industry Seeks Self-Sufficiency

BY DR. GUIDO VANZETTI
Special Correspondent

■ ITALIAN steel production for the first ten months of 1937, in comparison with that of the corresponding period of 1936, did not present appreciable variation, although an upward trend was evident. The total output of the first ten months was 1,785,870 metric tons in 1937, against 1,717,074 tons in the corresponding period of 1936.

Forecasts at the beginning of 1937 were for lower activity than in the previous year, but the strong demand for finished products caused production to rise from 159,256 tons in January to a maximum of 196,956 tons in July. In consequence of recent restrictive measures, a shrinkage took place in the later months, which theoretically should lead back the output of iron and steel for the whole year 1937 to a level not substantially higher than the total of 1936.

In regard to pig iron, the trend was entirely different. All efforts were concentrated on the increase of output by means of a rational exploitation of national mining resources. The exceptional shortage of electric power which took place in the winter of 1936-37 appreciably lowered the level of pig iron output, which in the first quarter of 1937 was lower than in the first quarter of 1936. A substantial revival took place later, the factors of which were the equipment of a new coke blast-furnace at Servola and a good output from the electric furnaces. In the first ten months of 1937 the output was brought back to practically the same level as in the corresponding period of 1936, and it is generally considered that the output of pig iron for 1937 will exceed that of 1936. A similar development took place as regards ferroalloys.

As far as prices of steel are concerned, there was

a continuous rise from January, 1937, in connection with the increase in prices of raw materials and generally with the enhanced cost of the means of production. For example, steel bars, which at the beginning of January were quoted at 910 lire per metric ton, Chiasso parity, suffered two subsequent increases (Jan. 26 and March 28) of 100 lire and 195 lire respectively, so that their price was brought to 1205 lire per ton, the quotation prevailing at the time of writing.

The Corporation of Mechanical and Metallurgical Industries, organ of the Italian Corporative State, effected in July, 1937, an intensive study of the situation of the Italian steel industry, especially from the point of view of its possibilities toward economic independence. The problem of Italian steel production from the point of view of the necessity of reducing to the minimum the outgoing of foreign currency for the purchase of raw materials was specially investigated.

The Italian steel industry consists of plants which are substantially based on the remelting of scrap. Those concerns which operate mainly on Italian ore, or residues of the treatment of iron pyrites, represent only a small percentage (about 10 to 15 per cent) of the total steel output of Italy. This is one of the prominent features of the Italian industry, which, in spite of its relatively small importance in comparison with other countries, places it, as American scrap exporters have discovered during recent years, in a prominent position as purchasers of scrap on the international market. On the average, Italy has imported over 700,000 tons of scrap per year during the last ten years.

In determining the reform scheme of the industry, the corporation established the following two principles: the maximum exploitation of national ore, and the making up of the deficit of raw materials through provision of materials complying with the following requirements: (1) maximum safety and continuity of provision, even in the case of war; (2) minimum disbursement of foreign currency.

Seek More Domestic Ore Supplies

From analysis of the possibilities of the various Italian mines, it resulted that ore extraction could reach in coming years a quantity equal to about half the ore requirements foreseen by the reform scheme and equal to 250 per cent of the Italian extraction of recent years. A further increase will be possible should the mining researches, which will be taken up on a large scale and with liberal availability of means by Italian metallurgical firms, give positive results.

The deficit of raw materials, as required for reaching an output of 2.5 million tons of raw steel per annum, which quantity is estimated to be the minimum indispensable for covering Italian requirements, amounts to 700,000 to 800,000 tons. On the basis of the market prices of the last ten years there resulted, from the point of view of disbursement of foreign currency, a considerable advantage in covering the said deficit through the import of ore, coal and coke, rather than by importing scrap.

On the other hand, the scrap trade, being practically controlled by foreign countries, presents characteristics of precariousness and uncertainty, so that the corporation decided that it was not advisable to base thereon, as in the past, an industry which is fundamental for the defence and the economy of Italy.

The corporation, however, did not prohibit the import of scrap, and decided to give the Italian metallurgical industry a certain degree of elasticity and the possibility of choosing between scrap and ore. To this effect it was established that the output of the integrated works, those that work starting from the ore, will have to be increased up to about 50 per cent of the total output. In consequence, Italian pig iron output will have to be considerably increased, and plants will, therefore, have to be enlarged or built. This necessity was already felt in part, inasmuch as the blast-furnaces existing in Italy would not have been in a position to utilize the full quantity of ore and pyrites available in Italy in consequence of the foreseen increase in extraction.

Government Backs New Companies

Two companies, mainly controlled by the state, undertook the charge of the actual execution of the proposed scheme, the "Ilva-Alti Forni e Acciaierie d'Italia" and the "Societa Italiana Acciaierie di Cornigliano" (S.I.A.C.). The "Ilva," which is the most important Italian metallurgical company, the only one having almost integrated or self-sufficient works, will increase the capacity of their works by building new blast furnaces, by modernizing steelworks and the coke ovens and widely concentrating in the said works the production hitherto effected in other steelworks operating with solid charge. When the works are completed, and this should be by 1940, the "Ilva" will have three integrated works situated on the coast and, therefore, in the best position for the provision of all raw materials, having a total productive efficiency of about 800,000 to 900,000 tons of raw steel per year.

The "S.I.A.C.," whose works specialize in defence production, will build, in the immediate neighborhood of Genova, the most important Italian harbor, entirely new ovens, blast-furnaces, steelworks, rolling mills and all the auxiliary plants. The production of the new works should be confined, at least in the beginning, to blooms, inasmuch as the placing of such material for subsequent treatment is already secured with the existing rolling mills of the "S.I.A.C." and with other works of the district. The salient feature of the "S.I.A.C." plant is represented by the fact that it will produce basic bessemer steel. This is the first time that the production of such steel will be taken up in Italy.

Besides these two most important initiatives, minor ones have been taken, and particularly worthy of mention is that of the "Acciaierie e Ferriere Lombarde Falck", of Milan, relating to the extension of the works for the production of pig iron by the electric furnace. Italy will thus rank first as producer of pig iron by the electric furnace.

The financial requirements for the execution of this program of works are already secured through the constitution of the Societa Finanziaria Siderurgica, which, with the proceeds of a special issue of bonds guaranteed by the State, will provide for the financing of "Ilva" and "S.I.A.C." for that portion which cannot be covered directly with the available funds of the two companies.

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Bessemer — Non-Bessemer

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"Shenango" Pig Iron

Bessemer — Basic

Malleable — Foundry

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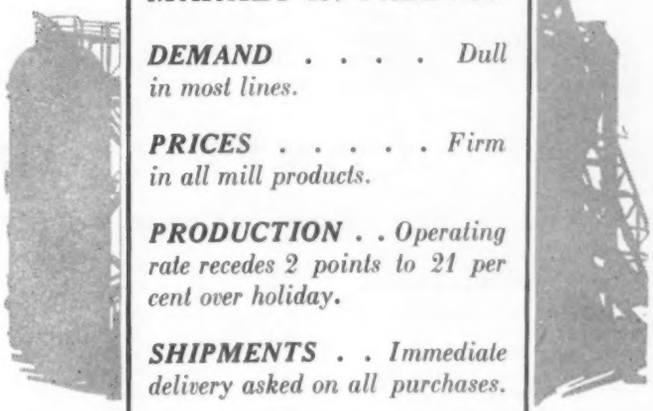
OLIVER BUILDING - PITTSBURGH

1938 Promises Gradual Industrial Uplift

Output at Bottom; Scrap Set for Rise; Railroads May Aid



MARKET IN TABLOID

DEMAND . . . . *Dull in most lines.*

PRICES . . . . . *Firm in all mill products.*

PRODUCTION . . *Operating rate recedes 2 points to 21 per cent over holiday.*

SHIPMENTS . . *Immediate delivery asked on all purchases.*

ALTHOUGH operating at the lowest rate in several years the steel industry faces the new year with hopefulness and discerns signs of a gradually increasing demand.

While general business is restricted and lack of confidence restrains buyers from covering freely, certain outlets for steel mill products show indications of requiring fairly heavy tonnages over a large portion of the year. Among these shipbuilding looms large, as both naval and merchant ships are planned and some of the steel placed. This is distinct from the general business situation and depends to considerable degree on subsidies from the government.

Railroads, usually large buyers about the year end, are holding back purchases until they have better income, dependent on action of the interstate commerce commission on the request for higher rates. Yet some moderate tonnages of rails and steel for rolling stock continue to be placed, aiding in establishing backlogs for delivery over the next few months.

Proposals that railroads make immediate commitments to cover rail and car needs in an effort to spur general business indicates need for more equipment and also seems to foreshadow a favorable decision on rates. Without the latter it would be difficult for many lines to finance the cost.

Building construction continues fairly steady, though not in heavy volume and this promises to give some aid to the general situation as the season advances. Much of this is of a public nature, by states, cities and the federal government.

However, without general participation by miscellaneous consumers of steel no large production will be possible. It does not appear likely this class of buying will be resumed promptly and as a result it is believed the early months of this year will bring only a moderate upturn in demand.

Steel production seemed to be scraping bottom as the year ended and last week approximated 21 per cent of capacity, a drop of 2 points from the preceding week. Lack of tonnage for continued rolling and interruption by the holidays account for the further decline. This week promises a slight stiffening of schedules. At Pittsburgh the rate rose 1 point to 15 per cent, in Eastern Pennsylvania 5 points to 30 per cent, at Buffalo 2 points to 16 per cent and at Birmingham 18 points to 63 per cent. The rate at Chicago dropped 1 point to 22.5 per cent, at Youngstown 4 points to 14, at Cleveland 6 points to 18, New England 9 points to 19, St. Louis 3 points to 12 and Detroit 19 points to 33 per cent. The rate at Wheeling was unchanged at 19 per cent, and Cincinnati 30 per cent.

Automobile production for the past week is estimated at 45,000 units, compared with 67,230 the preceding week. The estimate gives General Motors and Ford each 20,000, with Chrysler entirely idle and all other producers a total of 5000 cars.

Various influences are centering in the scrap market, all tending to strengthen the situation and increase prices. Melters in general seem well supplied to meet needs of the present low rate of production but apparently current prices are tempting and efforts are being made in various ways to obtain tonnage at these levels without causing an advance. Supplies are light and holders of scrap are not eager to sell at the market. The result of this situation is that prices are edging upward gradually and the stage is set for a decided advance as soon as mills enter the market for substantial tonnages. Meanwhile considerable influence is exerted in the East by export buying, with a large tonnage remaining to be covered by brokers participating in the recent sale to the European entente, whose purchases will be made cautiously over a period of several months in the effort not to cause a strong advance.

Continued steady rise in steelmaking scrap continues, even though buying is light, and the composite was increased 17 cents last week, to $13.75. This takes the market back to the level of early November. The influence of scrap prices increased the iron and steel composite 2 cents to $38.92. The finished steel composite remains unchanged at $61.70.

COMPOSITE MARKET AVERAGES

	Jan. 1	Dec. 25	Dec. 18	One Month Ago Dec., 1937	Three Months Ago Oct., 1937	One Year Ago Jan., 1937	Five Years Ago Jan., 1933
Iron and Steel	$38.92	$38.90	$38.90	$38.88	$39.59	$36.55	$28.17
Finished Steel	61.70	61.70	61.70	61.70	61.70	55.80	46.13
Steelworks Scrap..	13.75	13.58	13.41	13.24	15.93	18.12	6.23

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Jan. 1, 1938	Dec. 1937	Oct. 1937	Jan. 1937
Steel bars, Pittsburgh	2.45c	2.45c	2.45c	2.20c
Steel bars, Chicago	2.50	2.50	2.50	2.25
Steel bars, Philadelphia	2.74	2.75	2.74	2.49
Iron bars, Terre Haute, Ind.	2.35	2.35	2.35	2.10
Shapes, Pittsburgh	2.25	2.25	2.25	2.05
Shapes, Philadelphia	2.45½	2.46½	2.45½	2.25½
Shapes, Chicago	2.30	2.30	2.30	2.10
Tank plates, Pittsburgh	2.25	2.25	2.25	2.05
Tank plates, Philadelphia	2.43½	2.44½	2.43½	2.23½
Tank plates, Chicago	2.30	2.30	2.30	2.10
Sheets, No. 10, hot rolled, Pitts.	2.40	2.40	2.40	2.15
Sheets, No. 24, hot ann., Pitts.	3.15	3.15	3.15	2.80
Sheets, No. 24, galv., Pitts.	3.80	3.80	3.80	3.40
Sheets, No. 10, hot rolled, Gary	2.50	2.50	2.50	2.25
Sheets, No. 24, hot anneal., Gary	3.25	3.25	3.25	2.90
Sheets, No. 24, galvan., Gary	3.90	3.90	3.90	3.50
Plain wire, Pittsburgh	2.90	2.90	2.90	2.60
Tin plate, per base box, Pitts.	$5.35	$5.35	$5.35	$4.85
Wire nails, Pittsburgh	2.75	2.75	2.75	2.25

Semifinished Material

Sheet bars, open-hearth, Youngs.	$37.00	$37.00	$37.00	$34.00
Sheet bars, open-hearth, Pitts.	37.00	37.00	37.00	34.00
Billets, open-hearth, Pittsburgh	37.00	37.00	37.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	47.00	47.00	47.00	43.00

Pig Iron

	Jan. 1, 1938	Dec. 1937	Oct. 1937	Jan. 1937
Bessemer, del. Pittsburgh	$25.26	$25.26	$25.26	$22.31
Basic, Valley	23.50	23.50	23.50	20.50
Basic, eastern del. East. Pa.	25.26	25.34	25.26	22.26
No. 2 fdy., del. Pittsburgh	25.21	25.21	25.21	22.21
No. 2 fdy., Chicago	24.00	24.00	24.00	21.00
Southern No. 2, Birmingham	20.38	20.38	20.38	17.38
Southern No. 2, del. Cincinnati	23.89	23.89	23.69	20.69
No. 2X eastern, del. Phila.	26.135	26.21½	26.13½	23.13½
Malleable, Valley	24.00	24.00	24.00	21.00
Malleable, Chicago	24.00	24.00	24.00	21.00
Lake Sup., charcoal, del. Chicago	30.24	30.24	30.04	26.54
Gray forge, del. Pittsburgh	24.17	24.17	24.17	21.17
Ferromanganese, del. Pittsburgh	107.49	107.49	107.29	84.79

Scrap

Heavy melting steel, Pittsburgh	$13.75	$13.40	$17.15	$18.95
Heavy melt. steel, No. 2, E. Pa.	14.25	13.13	14.01	16.40
Heavy melting steel, Chicago	13.25	12.50	13.95	18.25
Rails for rolling, Chicago	14.25	14.25	17.25	19.40
Railroad steel specialties, Chicago	15.75	15.75	19.35	19.65

Coke

Connellsville, furnace, ovens	$4.25	$4.37	$4.45	$4.00
Connellsville, foundry, ovens	5.25	5.25	5.25	4.25
Chicago, by-product foundry, del.	11.00	11.00	11.00	10.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Prices Subject to Quantity Extras and deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, del.	2.60c
New York, del.	2.74c
Philadelphia, del.	2.70c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pacific ports, f.o.b. dock	2.96c

Hot Rolled Annealed No. 24

Pittsburgh	3.15c
Gary	3.25c
Chicago, delivered	3.28c
Detroit, delivered	3.35c
New York, delivered	3.49c
Philadelphia, del.	3.45c
Birmingham	3.30c
St. Louis, del.	3.38c
Granite City, Ill.	3.35c
Pacific ports, f.o.b. dock	3.81c

Galvanized No. 24

Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93c
Philadelphia, del.	4.10c
New York, delivered	4.14c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.06c
Pacific ports, f.o.b. dock	4.41c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
St. Louis, delivered	3.53c
Granite City, Ill.	3.50c

Cold Rolled No. 10

Pittsburgh	3.10c
Gary	3.20c
Detroit, delivered	3.31c
Philadelphia, del.	3.40c
New York, del.	3.44c
St. Louis, del.	3.33c
Granite City, Ill.	3.30c
Pacific ports, f.o.b. dock	3.71c

Cold Rolled No. 20

Pittsburgh	3.55c
Gary	3.65c
Detroit, delivered	3.76c
Philadelphia, del	3.85c
New York, del.	3.89c
St. Louis	3.78c
Granite City, Ill.	3.75c

Enameling Sheets

Pittsburgh, No. 10	2.90c
Pittsburgh, No. 20	3.50c
Gary, No. 10	3.00c
Gary, No. 20	3.60c
St. Louis, No. 10	3.13c
St. Louis, No. 20	3.73c

Tin and Terne Plate

Gary base, 10 cents higher

Tin plate, coke (base box) Pittsburgh	$5.35
Waste-waste, 2.80c; strip	2.50c
Long ternes, No. 24, unassorted, Pitts.	4.10c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.25c
New York, del.	2.54c
Philadelphia, del.	2.44½c
Boston, delivered	2.66c
Buffalo, delivered	2.49½c
Chicago or Gary	2.30c
Cleveland, del.	2.45½c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
Pacific ports, f.o.b. cars, dock	2.81c
St. Louis, delivered	2.52c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.46½c
New York, del.	2.51¼c
Boston, delivered	2.64½c
Bethlehem	2.35c
Chicago	2.30c
Cleveland, del.	2.46c
Buffalo	2.35c
Gulf Ports	2.66c
Birmingham	2.40c
Pacific ports, f.o.b. cars, dock	2.81c
St. Louis, del.	2.52c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.45c
Chicago or Gary	2.50c
Duluth	2.60c
Birmingham	2.60c
Cleveland	2.50c
Buffalo	2.55c
Detroit, delivered	2.60c
Pacific ports, f.o.b. cars, dock	3.01c
Philadelphia, del.	2.75c
Boston, delivered	2.86c
New York, del.	2.79c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.30c
Chicago or Gary	2.35c
Cleveland	2.35c
Moline, Ill.	2.35c
Buffalo	2.40c
Birmingham	2.45c

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.64c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.45c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.50c
Gulf ports	2.85c
Pacific coast ports, f.o.b. car docks	2.85c
Philadelphia, del.	2.75c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	2.30c
Chicago, Buffalo, Cleveland, Birm., Young.	2.35c
Gulf ports	2.70c

Wire Products

Prices apply to mixed carloads, base; less carloads subject to quantity extras.

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.75
Cement coated nails	$2.75

(Per pound)

Polished staples	3.45c
Galv. fence staples	3.70c
Barbed wire, galv.	3.40c
Annealed fence wire	3.15c
Galv. fence wire	3.55c
Woven wire fencing (base C. L. column)	.74
Single loop bale ties, (base C. L. column)	.63

To Manufacturing Trade

Plain wire, 6-9 ga.	2.90c
Galvanized wire	2.95c
Anderson, Ind. (merchant products only) and Chicago up $1; Duluth and Worcester up $2; Birmingham up $3.	
Spring wire, Pitts. or Cleveland	3.50c

Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars, Shafting

Pittsburgh	2.90c
Chicago	2.95c
Gary, Ind.	2.95c
Detroit	2.95c
Cleveland	2.95c
Buffalo	3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 3.00c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring 0.15
6100 bars 1.20
6100 spring 0.85
Cr. N., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40

Piling

Pittsburgh	2.60c
Chicago, Buffalo	2.70c

Strip and Hoops

(Base, hot-rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23⅛-in.	
Pittsburgh	2.40c
Chicago or Gary	2.50c
Birmingham base	2.55c
Detroit, del.	2.61c
Philadelphia, del.	2.70c
New York, del.	2.74c
Cooperage hoop,	
Pittsburgh	2.50c
Chicago	2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland	3.20c
Detroit, del.	3.41c
Worcester, Mass.	3.40c

Carbon	Cleve. Pitts.	Worcester, Mass.
0.26—0.50	3.20c	4.30c
0.51—0.75	4.45c	4.65c
0.76—1.00	6.30c	6.50c
Over 1.00	8.50c	8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pittsburgh, Chicago	$43.00
Do., rerolling quality	42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.80c
Do., axle steel	2.35c
Spikes, R. R. base	3.15c
Track bolts, base	4.35c
Tie plate, base	$46.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:

Carriage and Machine

½ x 6 and smaller	65-5 off
Do. larger, to 1-in.	60-10 off
Do. 1⅛ and 1¼-in.	60-5 off
Tire bolts	50 off

Plow Bolts

All sizes	65-5 off

Stove Bolts

In packages with nuts attached 70 off; in packages with nuts separate 70-10 off; in bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5 off
Elevator bolts	50-10-5 off

Nuts

S. A. E. semifinished hex.: ½ to ⅞-inch	60-10 off
Do., 9/16 to 1-inch	60-5 off
Do., over 1-inch	60 off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland	3.60c
Structural, Chicago	3.70c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-5 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75	off

Cut Nails

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts, Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
½	59½	49
¾	62½	53
1—3	64½	55½

Iron

¾	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld

Steel

2	57	47½
2½—3	60	50½
3½—6	62	52½
7 and 8	61	50½
9 and 10	60½	50

Iron

2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9—12	24½	10

Line Pipe

Steel

1 to 3, butt weld	63½
2, lap weld	56
2½ to 3, lap weld	59
3½ to 6, lap weld	61
7 and 8, lap weld	60
10-inch, lap weld	59½
12-inch, lap weld	58½

Butt Weld

Iron

	Blk.	Galv.
¾	25	7
1 and 1¼	29	13
1½	33	15½
2	32½	15

Lap Weld

1½	23½	7
2	25½	9
2½ to 3½	26½	11½
4	28½	15
4½ to 8	27½	14
9 to 12	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Weld

Sizes	Steel	Charcoal Iron
1½" OD x 13 Ga.	$10.45	$23.71
1¾" OD x 13 Ga.	11.89	22.93
2" OD x 13 Ga.	13.31	19.35
2" OD x 11 Ga.	15.49	23.36
2¼" OD x 13 Ga.	14.82	21.68
2¼" OD x 11 Ga.	17.38	26.02
2½" OD x 12 Ga.	17.82	26.57
2¾" OD x 12 Ga.	18.86	29.00
3" OD x 12 Ga.	19.73	31.36
3½" OD x 11 Ga.	24.89	39.81
4" OD x 10 Ga.	30.81	49.90
5" OD x 9 Ga.	47.57	73.93
6" OD x 7 Ga.	73.25	....

Seamless

	Hot Rolled	Cold Drawn
1" OD x 13 Ga.	$ 8.41	$ 9.46
1¼" OD x 13 Ga.	9.96	11.21
1½" OD x 13 Ga.	11.00	12.38
1¾" OD x 13 Ga.	12.51	14.09
2"OD x 13 Ga.	14.02	15.78
2¼" OD x 13 Ga.	15.63	17.60
2¼" OD x 12 Ga.	17.21	19.37
2½" OD x 12 Ga.	18.85	21.22
2¾" OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga.	20.97	23.60
4½" OD x 10 Ga.	40.15	45.19
3½" OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga.	32.83	36.94
5" OD x 9 Ga.	50.38	56.71
6" OD x 7 Ga.	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$46.00-47.00
4-in., Birmingham	49.00-50.00
4-in., Chicago	57.20-58.20
6 to 24-in., Chicago	54.20-55.20
6-in. & over, east fdy.	50.00
Do., 4-in.	53.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Billets and Blooms

4 x 4-*inch base; gross ton*

Pitts., Chi., Cleve., Buffalo, Young., Birm.	$37.00
Philadelphia	42.30
Duluth	39.00

Forging Billets

6 x 6 *to* 9 x 9-*in., base*

Pitts., Chicago, Buffalo	43.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleve., Young Sparrows Point	37.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	37.00

Wire Rods

Pitts., Cleve., No. 5 to ⅝-inch incl.	47.00
Do., over ⅝ to 41/64-inch incl.	52.00

Chicago up $1; Worcester up $2.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	2.10c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.00- 4.50
Connellsville, fdry.	5.00- 5.50
Connell. prem. fdry	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.75- 6.00
Wise county fur.	4.75- 5.00

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	10.25
Chicago, del.	11.00
Milwaukee, ovens	11.00
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.50
Indianapolis, del.	10.50
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	10.50
Detroit, del.	11.10
Philadelphia, del.	10.60

Coke By-Products

Spot, gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls. to jobbers	7.25c

Per ton, bulk, f.o.b. oven or port

Sulphate of ammonia	$29.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25c; 50c diff. below 1.75 sil. Gross tons.

	No. 2 Fdry.	Malle-able	Basic	Besse-mer
Basing Points:				
Bethlehem, Pa.	$25.00	$25.50	$23.50	$26.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Birmingham, Ala.‡	20.38	....	19.38	25.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	....	....	....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	25.00	....	24.50	....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	....	24.66	....
Boston from Birmingham	26.57	....	26.07	....
Boston from Everett, Mass.	26.30	26.80	25.80	27.30
Boston from Buffalo	26.45	26.95	25.95	27.45
Brooklyn, N. Y., from Bethlehem	27.47	27.97	....	....
Brooklyn, N. Y., from Bmghm.	27.25	....	....	....
Canton, O., fom Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	24.42	....	24.30	....
Cincinnati from Hamilton, O.	24.27	25.11	24.61	....
Cincinnati from Birmingham	23.89	....	22.89	....
Cleveland from Birmingham	24.32	....	23.82	....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.10
Muskegon, Mich., from Chicago, Toledo or Detroit	27.10	27.10	26.60	27.60
Newark, N. J., from Birmingham	26.21	....	....	....
Newark, N. J., from Bethlehem	26.53	27.03	....	....
Philadelphia from Birmingham	25.58	....	25.46	....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	....
Pittsburgh district from Neville Island	{ Neville, base plus 63c, 76c, and $1.13 switch'g charges			
Saginaw, Mich., from Detroit	26.45	26.45	25.95	25.95
St. Louis, northern	24.55	24.55	24.05	....
St. Louis from Birmingham	†24.12	....	23.82	....
St. Paul from Duluth	26.08	26.08	....	26.58

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $28.50, Phila. base, standard and copper bearing, $29.63.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	39.24
		Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality	
Pa., Mo., Ky.	$64.60
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Second Quality	
Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	41.80
New Jersey	51.00
Ohio	
First quality	43.70
Intermediate	39.90
Second quality	35.15

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	59.85
Birmingham, Ala.	51.30

Ladle Brick
(Pa., O., W. Va., Mo.)

Dry press	$30.00
Wire cut	$28.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	43.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$49.00
Chem. bonded chrome	49.00
Magnesite brick	69.00
Chem. bonded magnesite	59.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$20.00
Do., for barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty pd.	$102.50
Do., Baltimore, base	102.50
Do., del. Pittsburgh	107.49
Spiegeleisen, 19-21% dom. Palmerton, Pa., spot	33.00
Do., New Orleans	33.00
Do., 26-28%, Palmerton	39.00
Ferrosilicon, 50% freight allowed, c.l.	69.50
Do., less carload	77.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	106.50
2% carbon 111.50; 1%,	121.50
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.50
Ferrotungsten, stand., lb. con. del. cars	2.00-2.25
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod-plant, frt. all., net ton	142.50
Spot, carlots	145.00
Spot, ton lots	150.00
Ferrophosphorus, per ton, c. l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage	63.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage	80.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper										
	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Alumi-num 99%	Antimony American Spot, N. Y.	Nickel Cath-odes
Dec. 24	10.12½	11.12½	9.65	42.00	42.00	4.75	4.60	5.00	20.00	13.75	35.00
Dec. 25—Holiday.											
Dec. 27	10.12½	11.12½	9.65	42.00	42.00	4.75	4.60	5.00	20.00	13.75	35.00
Dec. 28	10.12½	11.12½	9.65	41.12½	41.12½	4.75	4.60	5.00	20.00	13.75	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.00c Conn. copper

Sheets

Yellow brass (high)	17.37½
Copper, hot rolled	19.12½
Lead, cut to jobbers	8.25
Zinc, 100-lb. base	10.50

Tubes

High, yellow brass	20.12½
Seamless copper	19.87½

Rods

High yellow brass	13.37½
Copper, hot rolled	15.62½

Anodes

Copper, untrimmed	16.37½

Wire

Yellow brass (high)	17.62½

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

New York	5.37½-5.62½
Cleveland	6.25-6.50
Chicago	5.75-6.00
St. Louis	5.75-6.00

Heavy Copper and Wire

New York, No. 1	7.25-7.50
Cleveland, No. 1	7.25-7.50
Chicago, No. 1	7.37½-7.62½
St. Louis	7.25-7.50

Composition Brass Borings

*New York	4.87½-5.12½

Light Copper

New York	5.25-5.50
Cleveland	5.25-5.50
Chicago	5.25-5.50
St. Louis	5.00-5.25

Light Brass

Cleveland	3.25-3.50
Chicago	3.62½-3.87½
St. Louis	3.25-3.75

Lead

New York	3.50-3.75
Cleveland	3.25-3.50
Chicago	3.50-3.75
St. Louis	3.25-3.50

Zinc

*New York	2.12½-2.25
Cleveland	2.00-2.50
St. Louis	2.25-2.50

Aluminum

Borings, Cleveland	6.75-7.00
Mixed cast, Cleve.	9.75-10.00
Clips, soft, Cleve.	11.75-12.00
Mixed cast, St. L.	9.25-9.75

SECONDARY METALS

Brass, ingot, 85-5-5-5, lcl.	11.25
Stand. No. 12 alum.	17.00-17.50

WAREHOUSE IRON AND STEEL PRICES

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore	4.00c
Birmingham	3.85c
Boston††	4.05c
Buffalo	3.90c
Chattanooga	4.21c
Chicago (j)	3.85c
Cincinnati	4.05c
Cleveland	3.75c
Detroit	3.93½c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.96c-4.11c
New Orleans	4.20c
New York‡ (d)	4.12c
Pitts. (h)	3.80c
Philadelphia	4.00c
Portland	4.50c
San Francisco	4.20c
Seattle	4.45c
St. Louis	4.09c
St. Paul	4.10c-4.25c
Tulsa	3.35c

IRON BARS

Portland	3.50c
Chattanooga	4.21c
Baltimore*	3.25c
Cincinnati	4.05c
New York‡ (d)	3.65c
Philadelphia	4.00c
St. Louis	4.09c

REINFORCING BARS

Buffalo	3.10c
Birmingham	3.85c
Chattanooga	4.21c
Cleveland (c)	2.55c
Cincinnati	3.75c
Houston	3.25c
Los Angeles, c.l.	2.975c
New Orleans*	3.24c
Pitts., plain (h)	2.55c
Pitts., twisted squares (h)	3.95c
San Francisco	2.97½c
Seattle	2.975c
St. Louis	3.99c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore	3.90c
Birmingham	3.75c
Boston††	3.92c
Buffalo	3.80c
Chattanooga	4.11c
Chicago	3.75c
Cincinnati	3.95c
Cleveland	3.86c
Detroit	3.95c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	3.97c
Philadelphia	3.90c
Pittsburgh (h)	3.70c
Portland (i)	4.25c
San Francisco	4.05c
Seattle (i)	4.25c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

PLATES

Baltimore	3.90c
Birmingham	3.75c
Boston††	3.93c
Buffalo	3.80c
Chattanooga	4.11c
Chicago	3.75c
Cincinnati	3.95c
Cleve., ¼-in., o'r	3.86c
Detroit	3.95c
Detroit, ⅜-in.	4.15c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	4.00c
Philadelphia	3.90c
Phila. floor	5.25c
Pittsburgh (h)	3.70c
Portland	4.25c
San Francisco	4.05c
Seattle	4.25c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

NO. 10 BLUE

Baltimore	3.95c
Birmingham	3.80c
Boston (g)	4.00c
Buffalo, 8-10 ga.	3.97c
Chattanooga	4.16c
Chicago	3.85c
Cincinnati	4.00c
Cleveland	3.91c
Det. 8-10 ga.	3.93½c
Houston	3.45c
Los Angeles	4.50c
Milwaukee	3.96c
New Orleans	4.35c
New York‡ (d)	4.07c
Portland	4.25c
Philadelphia	4.00c
Pittsburgh (h)	3.75c
San Francisco	4.30c
Seattle	4.50c
St. Louis	4.39c
St. Paul	4.10c
Tulsa	3.80c

NO. 24 BLACK

Baltimore*†	4.50c
Birmingham	4.55c
Boston (g)	4.75c
Buffalo	4.80c
Chattanooga*	4.06c
Chicago	4.45c-5.10c
Cincinnati	4.75c
Cleveland	4.66c
Detroit	4.68½c
Los Angeles	5.05c
Milwaukee	4.56c-5.21c
New York‡ (d)	4.82c
Philadelphia	4.65c
Pitts.** (h)	4.75c
Portland	5.15c
Seattle	5.35c
San Francisco	5.15c
St. Louis	4.84c
St. Paul	4.75c
Tulsa	4.85c

NO. 24 GALV. SHEETS

Baltimore*†	4.70c
Birmingham	5.20c
Buffalo	5.45c
Boston (g)	4.85c
Chattanooga*	4.66c
Chicago (h)	5.10c-5.75c
Cincinnati	5.40c
Cleveland	5.31c
Detroit	5.40c
Houston	4.50c
Los Angeles	5.75c
Milwaukee	5.21c-5.86c
New Orleans*	5.75c
N. Y. ov. 10 bd.	5.00c
Philadelphia	5.30c
Pitts.** (h)	5.40c
Portland	5.90c
San Francisco	5.85c
Seattle	5.90c
St. Louis	5.49c
St. Paul	5.40c
Tulsa	5.20c

BANDS

Baltimore	4.20c
Birmingham	4.05c
Boston††	4.25c
Buffalo	4.22c
Chattanooga	4.41c
Cincinnati	4.25c
Cleveland	4.16c
Chicago	4.10c
Detroit, ⅛ & Und.	4.185c
Houston	3.35c
Los Angeles	4.80c
Milwaukee	4.21c
New Orleans	4.75c
New York‡ (d)	4.32c
Philadelphia	4.10c
Pittsburgh (h)	4.00c
Portland	5.00c
San Francisco	4.80c
Seattle	4.95c
St. Louis	4.34c
St. Paul	4.35c

HOOPS

Baltimore	4.45c
Boston††	5.25c
Buffalo	4.22c
Chicago	4.10c
Cincinnati	4.25c
Detroit, 14 & Und.	4.185c
Los Angeles	6.55c
Milwaukee	4.21c
New York‡ (d)	4.32c
Philadelphia	4.35c
Pittsburgh (h)	4.50c
Portland	6.50c
San Francisco	6.50c
Seattle	6.30c
St. Louis	4.34c
St. Paul	4.35c

COLD FIN. STEEL

Baltimore (c)	4.50c
Birmingham	4.91c
Boston*	4.65c
Buffalo (h)	4.35c
Chattanooga*	4.86c
Chicago (h)	4.30c
Cincinnati	4.50c
Cleveland (h)	4.30c
Detroit	4.30c
Los Ang. (f) (d)	6.85c
Milwaukee	4.41c
New Orleans	5.10c
New York‡ (d)	4.57c
Philadelphia	4.53c
Pittsburgh	4.15c
Portland (f) (d)	7.10c
San Fran. (f) (d)	6.80c
Seattle (f) (d)	7.10c
St. Louis	4.54c
St. Paul	4.77c
Tulsa	4.80c

COLD ROLLED STRIP

Boston	3.845c
Buffalo	3.79c
Chicago	3.87c
Cincinnati	3.82c
Cleveland (b)	3.60c
Detroit	3.43c
New York‡ (d)	3.92c
St. Louis	4.54c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up.)

	Base
High speed	80c
High carbon, Cr.	45c
Oil hardening	26c
Special tool	24c
Extra tool	20c
Regular tool	16c
Water hardening	12½c
Uniform extras apply.	

BOLTS AND NUTS

(100 pounds or over)

	Discount
Birmingham	50-10
Chicago (a)	55 to 60
Cleveland	60-5-5
Detroit	70-10
Milwaukee	60 to 65
New Orleans	60
Pittsburgh	65-5

(a) Under 100 lbs., 50 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) Shapes other than rounds, flats, fillet angles, 0.15c higher.

On plates, shapes, bars, hot strip and blue annealed quantity extras and discounts as follows: Under 100 lbs., add $1.50; 100 to 399 lbs., add 50c; 400 to 3999 lbs., base; 4000 to 9999 lbs., deduct 10c; over 10,000 lbs., deduct 15c. At Cleveland, under 400 lbs., add 50c, with $1 minimum invoice.

‡Domestic steel; *Plus quantity extras; **One to 9 bundles; *† 50 or more bundles; †New extras apply; ††Base 10,000 lbs., extras on less.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 27

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	Continental Channel or North Sea ports, metric tons **Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$30.00 6 0 0	$20.51	2 11 0
Basic bessemer	....	20.80	2 12 0
Hematite, Phos. .03-.05	26.25 7 5 0	.....	.....
SEMIFINISHED STEEL			
Billets	$39.38 7 17 6	$43.01	5 7 6
Wire rods, No. 5 gage	56.38 11 5 6	48.00	6 0 0
FINISHED STEEL			
Standard rails	$50.63 10 2 6	$46.00	5 15 0
Merchant bars	2.73c 12 5 0	2.17c to 2.27c	6 0 0 to 6 5 0
Structural shapes	2.37c 10 12 6	1.94c	5 7 6
Plates, †¼ in. or 5 mm.	2.58c 11 11 3	2.59c	7 2 6
Sheets, black, 24 gage or 0.5 mm	3.34c 15 0 0	3.18c	8 15 0††
Sheets, gal., 24 gage, corr.	3.96c 17 15 0	3.99c	11 0 0
Bands and strips	3.07c 13 15 0	2.17c	6 0 0
Plair wire, base	4.35c 19 10 0	2.42c	6 17 6
Galvanized wire, base	5.18c 23 5 0	3.18c	8 15 0
Wire nails, base	4.13c 18 10 0	2.90c	8 0 0
Tin plate, box 108 lbs.	$ 5.63 1 2 6	.....	.....

British ferromanganese $102.50 delivered Atlantic seaboard, duty-paid.

Domestic Prices at Works or Furnace—Last Reported

		£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$26.50	5 6 0(a)	$18.84	554	$25.50	750	$25.41	63
Basic bessemer pig iron	25.00	5 0 0(a)	.....	.....	.....	.....	28.03 (b)	69.50
Furnace coke	9.38	1 17 6	6.43	189	7.31	215	7.66	19
Billets	39.38	7 17 6	28.56	840	32.64	960	38.92	96.50
Standard rails	2.26c	10 2 6	17.30c	1,150	2.06c	1,375	2.38c	132
Merchant bars	2.55c	11 9 0	1.62c	1,080	1.65c	1,100	1.98c	110
Structural shapes	2.46c	11 0 6	1.58c	1,055	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm.	2.61c	11 14 3	2.03c	1,350	2.06c	1,375	2.29c	127
Sheets, black	3.51c	15 15 0§	2.35c	1,565‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	4.35c	19 10 0	3.30c	2,200	4.50c	3,000	6.66c	370
Plain wire	4.35c	19 10 0	2.49c	1,660	2.48c	1,650	3.11c	173
Bands and strips	2.72c	12 4 0	1.82c	1,210	2.33c	1,550	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. del. Middlesbrough. b hematite. ††Close annealed.
**Gold pound sterling carries a premium of 64.3 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Dec. 29. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	10.00
Birmingham, No. 2.	9.00
Bos. dock No. 1 exp.	14.00-14.25
N. Eng. del. No. 1..	13.50
Buffalo, No. 1	13.00-13.50
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	13.00-13.50
Cleveland, No. 1 ..	12.50-13.00
Cleveland, No. 2 ...	11.50-12.00
Detroit, No. 1	9.50-10.00
Eastern Pa., No. 1..	14.50-15.00
Eastern Pa., No. 2..	13.00-13.50
Federal, Ill.	11.00-11.50
Granite City, R. R..	13.00-13.50
Granite City, No. 2.	11.00-11.50
New York, No. 1....	†11.00
N. Y. dock No. 1 exp.	13.50
Pitts., No. 1 (R. R.)	14.50-15.00
Pitts., No. 1 (dlr.)..	13.50-14.00
Pittsburgh, No. 2...	12.00-12.50
St. Louis, R. R.....	13.00-13.50
St. Louis, No. 2....	11.00-11.50
San Francisco, No. 1	14.00-15.00
Seattle, No. 1	8.00
Seattle, No. 2	7.00
Toronto, dirs. No. 1	10.00
Toronto, No. 2	9.00
Valleys, No. 1	13.50-14.00

COMPRESSED SHEETS

Buffalo, dealers....	12.00-12.50
Chicago, factory ...	12.00-12.50
Chicago, dealer	11.50-12.00
Cleveland	12.00-12.50
Detroit	10.25-10.75
E. Pa., new mat. ..	14.50-15.00
E. Pa., old mat.	10.50-11.00
Pittsburgh	13.50-14.00
St. Louis	7.25- 7.75
Valleys	12.50-13.00

BUNDLED SHEETS

Buffalo	9.50-10.00
Cincinnati, del.	9.50-10.00
Cleveland	9.00- 9.50
Pittsburgh	12.00-12.50
St. Louis	6.75- 7.00
Toronto, dealers ...	7.00

SHEET CLIPPINGS, LOOSE

Chicago	7.00- 7.50
Cincinnati	6.00- 6.50
Detroit	7.00- 7.50
St. Louis	5.50- 6.00

STEEL RAILS, SHORT

Birmingham	15.00
Buffalo	18.00-18.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.00-16.50
Cincinnati, del.	17.00-17.50
Detroit	14.50-15.00
Pitts., 3 ft. and less	17.50-18.00
St. Louis, 2 ft. & less	15.00-15.50

STEEL RAILS, SCRAP

Boston district	†11.00
Buffalo	15.50-16.00
Chicago	13.00-13.50
Cleveland	16.50-17.00
Pittsburgh	15.00-15.50
St. Louis	13.00-13.50
Seattle	10.00

STOVE PLATE

Birmingham	8.00- 8.50
Boston, district	†8.00
Buffalo	11.50-12.00
Chicago, net	8.50- 9.00
Cincinnati, dealers..	5.50- 6.00
Detroit, net	8.50- 9.00
Eastern Pa.	13.00-13.50
New York, fdry.	†8.50- 9.00
St. Louis	9.00- 9.50
Toronto, deal'rs, net	9.00

SPRINGS

Buffalo	18.00-18.50
Chicago, coil	17.00-17.50
Chicago, leaf	15.50-16.00
Eastern Pa.	18.00-18.50
Pittsburgh	18.00-18.50
St. Louis	15.00-15.50

ANGLE BARS—STEEL

Chicago	15.00-15.50
St. Louis	12.50-13.00

RAILROAD SPECIALTIES

Chicago	15.50-16.00

LOW PHOSPHORUS

Buffalo, crops	18.50-19.00
Cleveland, crops ...	19.50-20.50
Eastern Pa., crops..	19.00-19.50
Pittsburgh, crops...	18.00-19.00

FROGS, SWITCHES

Chicago	13.00-13.50
St. Louis, cut	13.50-14.00

SHOVELING STEEL

Federal, Ill.	11.00-11.50
Granite City, Ill. ..	11.00-11.50
Toronto, dealers....	8.00

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.00- 9.50
Buffalo, No. 1	11.00-11.50
Buffalo, No. 2	13.00-13.50
Chicago, No. 1 net..	10.00-10.50
Cincinnati, No. 2...	9.50-10.00
Eastern Pa., No. 1..	15.50-16.00
St. Louis, No. 1 ...	9.00- 9.50
St. Louis, No. 2....	13.00-13.50
Toronto, No. 1 dlr...	16.00

SPECIFICATION PIPE

Eastern Pa.	13.50-14.00
New York	†9.00- 9.50

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	10.00-10.50
Cincin., No. 1, deal..	8.50- 9.00
Cincinnati, No. 2...	3.00- 3.50
Cleveland, No. 2 ..	8.50- 9.00
Detroit, No. 1, new.	9.50-10.00
Valleys, new, No. 1	12.50-13.00
Toronto, dealers....	7.00

MACHINE TURNINGS

Birmingham	6.00- 7.00
Buffalo	9.00- 9.50
Chicago	6.50- 7.00
Cincinnati, dealers..	4.00- 4.50
Cleveland	7.50- 8.00
Detroit	5.25- 5.75
Eastern Pa.	8.50- 9.00
New York	†5.00- 5.50
Pittsburgh	7.00- 7.50
St. Louis	5.00- 5.50
Toronto, dealers....	7.00
Valleys	9.50-10.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†2.50
Buffalo	9.00- 9.50
Cincinnati, dealers..	3.50- 4.00
Cleveland	9.00- 9.50
Detroit	6.25- 6.75
Eastern Pa.	8.00- 8.50
New York	†4.50- 5.00
Pittsburgh	7.00- 7.50
Toronto, dealers....	7.50

CAST IRON BORINGS

Birmingham	6.00- 7.00
Boston dist. chem...	†7.50- 8.00
Bos. dist. for mills	†7.00- 7.50
Buffalo	9.00- 9.50
Chicago	6.00- 6.50
Cincinnati, dealers..	3.50- 4.00
Cleveland	9.00- 9.50
Detroit	6.25- 6.75
E. Pa., chemical....	13.50-14.00
New York	†4.50- 5.00
St. Louis	5.00- 5.50
Toronto, dealers....	7.50

PIPE AND FLUES

Cincinnati, dealers..	7.00- 7.50
Chicago, net	7.50- 8.00

RAILROAD GRATE BARS

Buffalo	9.50-10.00
Chicago, net	8.50- 9.00
Cincinnati	5.50- 6.00
Eastern Pa.	13.00-13.50
New York	†8.50- 9.00
St. Louis	9.00- 9.50

FORGE FLASHINGS

Boston district	†6.50
Buffalo	12.00- 12.50
Cleveland	11.00- 11.50
Detroit	9.00- 9.50
Pittsburgh	12.25-12.75

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.50-16.00

ARCH BARS, TRANSOMS

St. Louis	15.50-16.00

AXLE TURNINGS

Boston district	†7.50
Buffalo	13.00-13.50
Chicago, elec. fur...	11.50-12.00
Eastern Pa.	13.00-13.50
St. Louis	9.50-10.00
Toronto	8.00

STEEL CAR AXLES

Birmingham	16.00-17.00
Buffalo	18.00-18.50
Boston district	†14.00
Chicago, net	17.00-17.50
Eastern Pa.	20.50-21.50
St. Louis	18.50-19.00

SHAFTING

Boston district	†15.00
New York	†15.50-16.00
Eastern Pa.	19.00-19.50
St. Louis	13.00-13.50

CAR WHEELS

Birmingham	14.00-15.00
Boston dist., iron...	†10.00
Buffalo, steel	18.50-19.00
Chicago, iron	14.50-15.00
Chicago rolled steel	15.50-16.00
Cincinnati, iron	15.00-15.50
Eastern Pa., iron..	16.50-17.00
Eastern Pa., steel..	18.00-18.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel...	18.00-18.50
St. Louis, iron	14.00-14.50
St. Louis, steel	15.50-16.00

NO. 1 CAST SCRAP

Birmingham	14.00-14.50
Boston, No. 1 mach.	†11.00
N. Eng. del. No. 2..	12.00
N. Eng. del. textile.	15.50-16.00
Buffalo, cupola ...	14.00-14.50
Buffalo, mach.	14.50-15.00
Chicago, agri. net..	10.50-11.00
Chicago, auto	11.50-12.00
Chicago, railr'd net	10.50-11.00
Chicago, mach. net.	12.50-13.00
Cincin., mach. cup...	10.50-11.00
Cleveland, mach....	17.00-17.50
Eastern Pa., cupola.	16.00-16.50
E. Pa., mixed yard.	13.50-14.00
Pittsburgh cupola..	16.00-16.50
San Francisco, del..	13.50-14.00
Seattle	8.00
St. Louis, No. 1 ...	12.00-12.50
St. L., No. 1, mach.	12.50-13.00
Toronto, No. 1, mach., net	12.50

HEAVY CAST

Boston dist. break..	†8.50
N. Eng., del.	12.50-13.00
Buffalo, break	11.50-12.00
Cleveland, break....	14.50-15.50
Detroit, break.	10.00-10.50
Detroit, auto net...	12.50-13.00
Eastern Pa.	14.00-14.50
New York, break. ..	†10.50-11.00
Pittsburgh	13.00-13.50

MALLEABLE

Birmingham, R. R.	12.50-13.50
New England, del...	16.00
Buffalo	14.00-14.50
Chicago, R. R.	14.50-15.00
Cincin., agri. del...	10.50-11.00
Cleveland, rail	15.50-16.00
Detroit, auto	11.50-12.00
Eastern Pa., R. R. ..	16.50-17.50
Pittsburgh, rail	13.75-14.25
St. Louis, R. R.	14.00-14.50

RAILS FOR ROLLING

5 feet and over

Birmingham	16.00-17.00
Boston	†12.00
Chicago	14.00-14.50
Eastern Pa.	18.00-18.50
New York	†15.00-15.50
St. Louis	14.00-14.50

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	14.75-15.25

LOW PHOS. PUNCHINGS

Buffalo	17.50-18.00
Chicago	14.50-15.00
Eastern Pa.	18.00-18.50
Pittsburgh (heavy).	17.50-18.00
Pittsburgh (light)..	14.00-14.50
Seattle	15.00

Iron Ore

Lake Superior Ore

Gross ton, 51½ % Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	nominal
Swedish low phos...	17.00-18.00
Spanish No. Africa basic, 50 to 60% nom..	12.00
Tungsten, sh. ton. unit, duty paid nom.	24.50-25.50
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f...	$25.50-26.50

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% .. non.	45.00
So. African, 50-52% non.	45.00
Indian, 50-52%	Nominal

—The Market Week—

Sheets

Sheet Prices, Page 336

Cleveland — Sheet specifications continue to reflect holiday dullness. However, in some instances where stocks were abnormally low, consumers came into the market for fill-in purposes only. With consumption remaining at the present low ebb no substantial improvement in buying is anticipated this month. Large inventories still exist in isolated cases, but most consumers are carrying stocks well below normal. Prices remain firm.

Chicago — Sheet mill order books reflect buying which is principally for immediate shipment, as consumers still refrain from ordering ahead. Improved consumption consequently is thought necessary to provide any definite upturn in bookings. Inventories of most sheet consumers have been reduced sharply the past three months and increased consumption will be reflected promptly in new business.

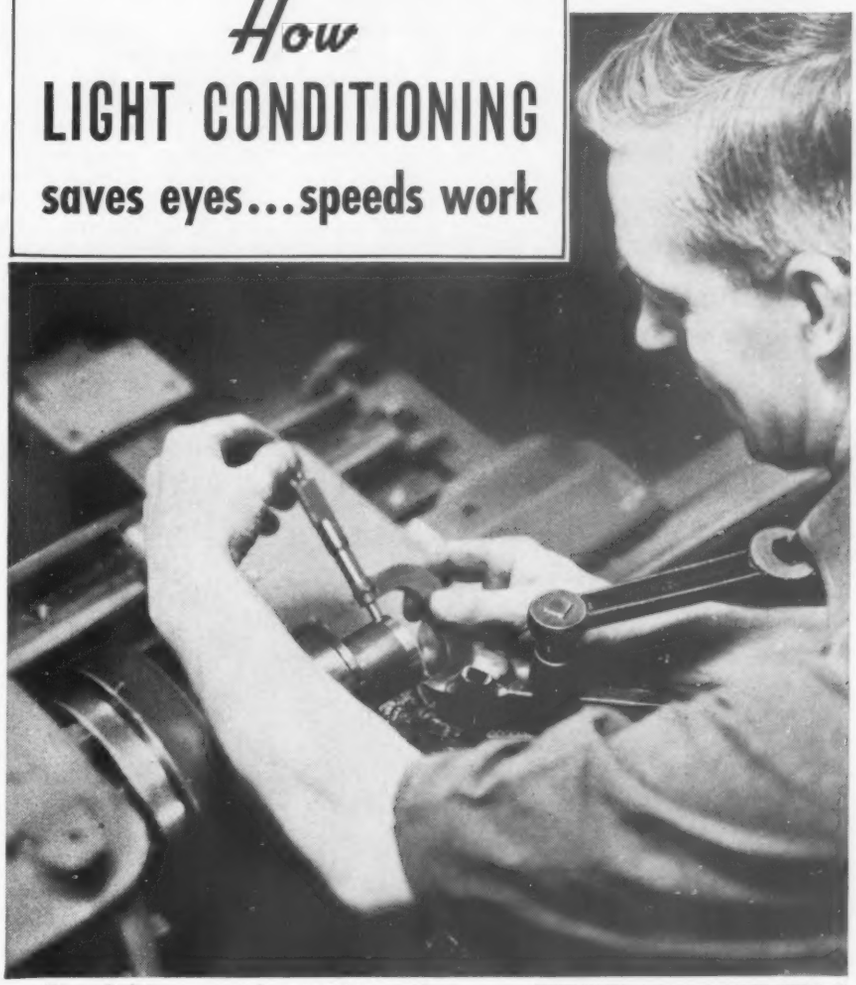
Boston — Scattered miscellaneous orders for sheets for shipment during the next few weeks are appearing, but such volume is small. Following the prolonged dullness of recent weeks, however, this trend represents slightly improved sentiment. Sheet consumption is sluggish and until a gain is registered by fabricated goods, buying is likely to be light. Some jobbers are preparing orders to fill gaps in stocks.

New York — While sheet sellers are conservative in appraisal of business over the next few weeks they nevertheless anticipate some gain toward the latter part of this month. Stocks at a number of consuming plants have reached a point, they believe, where some fill-in buying will be necessary. Although not up to the volume of the past couple of years, buying by refrigerator manufacturers is showing some further expansion as production gets under way for the spring season.

Philadelphia — Current sheet buying reflects the effects of usual year-end influences. Some material has been ordered for early January shipment but interest for this month, in general, is passive. Reports in some quarters indicate inventories were smaller as the year closed than previously estimated. It is understood that Philco will move its auto radio engineering division to Detroit. The manufacturing division will remain in Philadelphia, contrary to previous reports.

Cincinnati — Several major consumers of sheets have entered the market for first quarter requirements which, although light in com-

How
LIGHT CONDITIONING
saves eyes...speeds work



Better lighting—more than 100 footcandles—helps insure the accuracy of precision work such as making micrometer readings.

Light conditioning in an industrial plant simply means providing the right amount of light and the right kind of lighting for seeing and comfort.

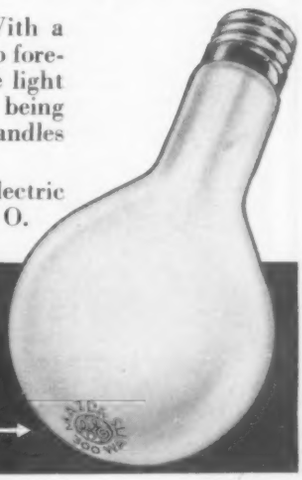
Thanks to lighting research, the kind and amounts of light needed for various industrial processes can be easily determined. For example, certain kinds of close seeing, precision work require 50, 100 or more footcandles of light to be done efficiently and with minimum eyestrain.

Today, it is easy to tell whether your shop or factory meets the modern safe seeing standards that light conditioning provides. With a General Electric Light Meter, you and your shop foremen and plant superintendents can measure the light accurately. You can tell how much light is being received and what the minimum required footcandles should be for specific seeing tasks.

For further information, write to General Electric Company, Dept. 166-S, Nela Park, Cleveland, O.

USE THE G-E LIGHT METER TO MEASURE YOUR LIGHTING

With a G-E Light Meter you can measure lighting. It shows the amount of light under which seeing tasks are done. Only $11.50



EDISON MAZDA LAMPS
GENERAL ELECTRIC
They stay brighter longer →

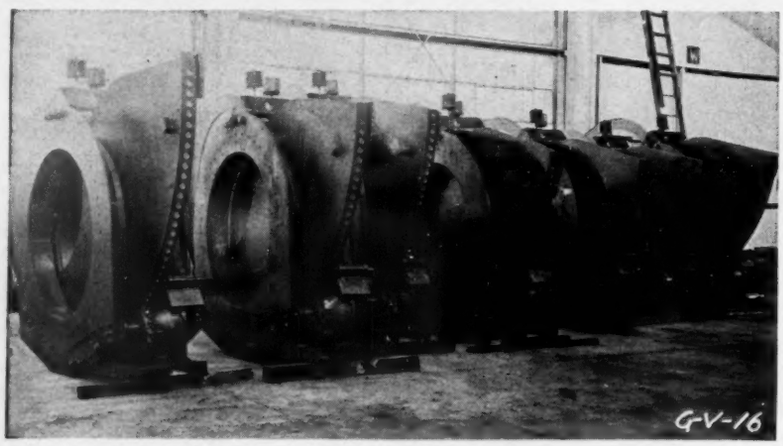
parison to needs during some periods of 1937, are heavier than in fourth quarter. Buying for near needs by other consumers also shows an improvement trend.

Pittsburgh — Sheet needs are maturing slowly and are not likely to become definite for a fortnight. Several small producers are idle this week.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 337

Some rebound in production of bolts and nuts is expected this month. Distributors have some stock replacements to make and there is a little better direct consumer business in prospect, notably from shipyards. Several eastern railroads have placed contracts over the past week for routine quarterly requirements and specifications will probably develop shortly. Outstanding in railroad requirements is a tonnage for the 1100 freight cars for the Western Maryland. Automotive requirements are expected to show little improvement during the current month. Operations at the close of last month dipped below 20 per cent for eastern bolt and nut producers, the lowest point in many months.



EIGHTEEN

FORTY-TWO

BROSIUS AUTOMATIC MOTOR OR HAND OPERATED GOGGLE VALVES

have been built, twenty-four since January 1, 1937. Ten of these valves are in the gas mains of a furnace producing ferro-manganese; four in the dirty gas mains with the gas temperatures approximately 650° F., and six of them in the clean gas mains after the electric precipitators. Others are installed in the mains of furnaces producing pig iron, both in dirty and clean gas mains.

The valve is self contained and independent of the gas line in its operation. The renewable valve seats are flexible, conforming to any slight distortion of the valve due to stresses in the line, thus maintaining a tight valve at all times.

A complete cycle of motor operation takes only 12 to 20 seconds, depending upon the size of the valve, while hand operation is proportionately longer.

OTHER PRODUCTS

Steam, Hydro-Electric, and Electric-Mechanical Clay Guns, Cinder Notch Stoppers, Flue Dust Conditioners, Blast Furnace Slag Granulating Machines, Soaking Pit Cover Carriages, Single Hook Grab Buckets, Automatic Dump Buckets, Automatic Single Hoist Grab Buckets, Overhead and Auto Floor Charging Machines for serving Heating and Melting Furnaces, Auto Floor Manipulators for serving Steam Hammers, Presses, etc.

Edgar E. BROSIUS, Inc.

Engineers and Manufacturers

PITTSBURGH SHARPSBURG BRANCH PA.

European Distributor: Dango & Dienenthal, Siegen, Westphalia, Germany

Brosius Equipment is covered by patents allowed and pending in the United States and Foreign Countries.

Strip

Strip Prices, Page 337

Pittsburgh — Stripmakers are slowly receiving routine orders and auto partsmakers have not yet increased their requirements appreciably. Demand is largely for narrower widths.

Cleveland — Sellers of hot and cold-rolled strip report booking some new business for prompt shipment. However, most consumers have ample stocks and are intent on reducing inventories before making further commitments. Current requirements are far below the comparable period a year ago. Despite the fact that inventories are below normal they are sufficient to meet present needs. If the expected improvement in consumption materializes a marked upturn in specifications will soon follow.

Chicago—Strip users are in no hurry to order for future needs and sales last week continued to be made up of small lots. Only moderate improvement is looked for during January though consumers' inventories have been reduced sufficiently to necessitate close regulation between current requirements and incoming shipments.

Boston—A few orders for narrow cold strip have accumulated for shipment early this quarter, following recent low operations. Such tonnage is not sufficient to materially increase finishing schedules. Nothing has developed to indicate much change in the type of buying and a continuance of fill-in orders is anticipated during the next few weeks. Few consumers have covered fully on quarterly needs. Hot strip demand is lacking. Prices are steady.

New York — While consumer stocks of narrow cold strip have been materially lowered, improvement in buying is expected to parallel closely demand for finished fabricated goods. Few contracts have been closed for future needs and hand-to-mouth buying is expected to continue. Hot strip demand is slack, most re-rollers still having substantial stocks. Prices are firm and not subject to much pressure on the current type of buying.

Philadelphia—Narrow strip consumption continues to run ahead of new buying, which leads sellers to believe somewhat improved buying

will develop after inventory-taking. Prices remain steady.

Plates

Plate Prices, Page 336

Cleveland—Most plate sellers anticipate a gradual improvement in specifications through January, for considerable tonnage will be required for ship repair work. Also considerable tonnage for needed freight cars is held up by the railroads, awaiting a favorable decision by the ICC on their request for a general rate increase. Miscellaneous plate requirements in structural work should also show some improvement through January.

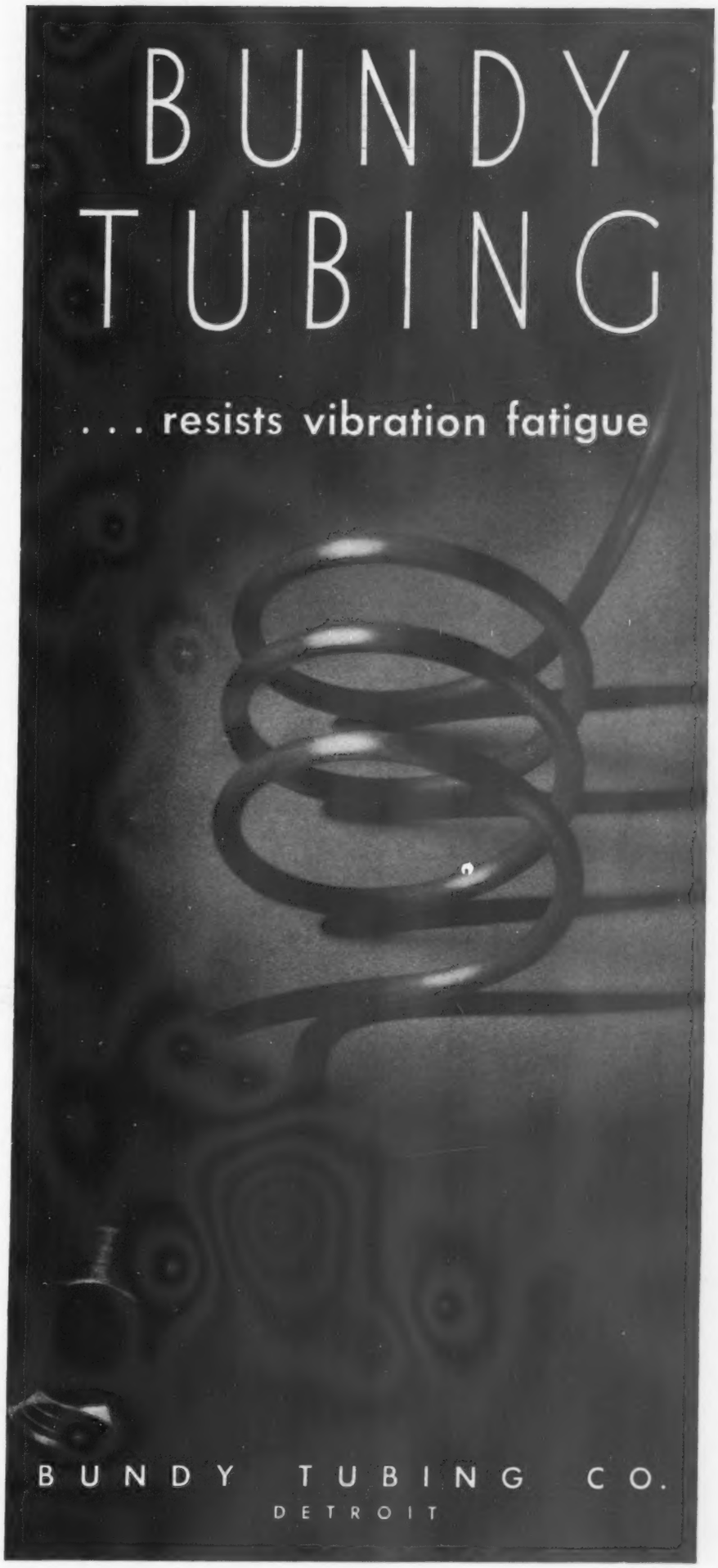
Chicago—In spite of the small number of freight cars pending, plate producers are hopeful that proposed plans for an early increase in equipment buying will result in improved plate shipments to car builders. Miscellaneous plate users are placing only small lots for prompt needs. One more Mississippi river dam is expected to come up for bids early this year.

Boston—Few car-lot plate orders are being placed, most buying being in small lots. Fabricators and railroads are taking little material. Shipyards and paper mill equipment offers the best outlet, several digesters in upper New England pulp mills being considered. Shipyards have most ways engaged, but at least one will bid on the maritime commission boats Feb. 1.

New York—With pending ship work along the eastern seaboard more active than in a number of months and the Western Maryland list of 1100 freight cars, including 500 hoppers, scheduled for action Jan. 10, plate makers are starting off the new year with better prospects than they anticipated a short time ago. Moreover they look for some miscellaneous replacement buying after inventory period and have booked some orders from railroads for miscellaneous first quarter requirements.

Philadelphia—Plate demand still is sufficient only to balance output of one furnace at each of three plants as the year opens. One plate mill is scheduled to resume this week after a two-weeks' shutdown for repairs. Other mills are rolling two or three days weekly. Some encouragement is seen in the fact that inventories have been pared down in a number of directions and new buying will be necessary this month. Prices are firm.

Seattle—The city received bids Dec. 27 for the cross-town Volunteer Park water system extension,



involving over 1000 tons of plates and alternates for cast iron pipe for certain sizes. The tenders will not be opened until after Jan. 1, following sale of a proposed bond issue to finance the improvement.

Plate Contracts Placed

205 tons, tank repairs, Humble Pipe Line Co., Viola, Tex., to Wyatt Metal & Boiler Works, Dallas, Tex.

Plate Contracts Pending

1000 tons or more, Seattle cross-city water system extension; bids received Dec. 27.

Unstated tonnage, elevated water tank, federal reformatory camp, Petersburg, Va., Pittsburgh-Des Moines Steel Co., Pittsburgh, low.

Bars

Bar Prices, Page 336

Pittsburgh — Bar mills lack specifications and new business is slow. Operations are spasmodic and uncertain as orders await sufficient volume to make rolling possible.

Cleveland — Sellers of carbon alloy steel bars report little change in current requirements. Some additional specifications have been received for prompt shipment, but these are relatively light and represent fill-in purposes only. Consumption is fairly well maintained, with farm equipment manufacturers most active. The latter are anticipating comparatively heavy demand this spring and are therefore manufacturing equipment and supplying distributors now in preparation for such future demand. Specifications from automotive partsmakers are naturally affected by the almost complete shutdown in this industry since Christmas week.

Chicago—Bar sales lately have continued for prompt shipment and mills have little tonnage for future delivery. The new month, however, is expected to see slightly more liberal buying since inventories of many consumers are at a minimum. Demand from farm equipment manufacturers likely will hold steady this month but the outlook for bar shipments to the automotive industry is uncertain.

Boston—Carbon steel bar buying, still in small lots, has improved only slightly. Alloy demand has also failed to increase. Government shops are the most active consumers of alloy bars at the moment. Forging material inquiry has not improved materially, but stocks of forging bars are not large as a rule.

New York—Routine contracting of eastern railroads for first quarter miscellaneous requirements has stimulated bar demand somewhat and as the month gets under way improvement in other quarters is anticipated as some miscellaneous replacement buying is expected after inventory period. Shipwork, both naval and private, also holds out more of promise than in some time.

Philadelphia—Moderate improvement in commercial bar specifications is seen this month, now that inventory-taking is practically out of the way. In the meantime, current buying is geared closely to actual requirements. No delay in deliveries is noted except where special analyses and gages are required. Quotations hold firm.

Wire

Wire Prices, Page 337

Cleveland — Wire producers continue on substantially reduced schedules, as local jobbers and miscellaneous consumers continue to specify only for current needs. Inventories of both producers and consumers are well below normal and little interest is shown in building up stocks. Auto partsmakers remain inactive since

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THE OHIO ELECTRIC MFG. CO.

5906 Maurice Ave., Cleveland, Ohio

they have already built up a large bank of parts and are now awaiting releases. Demand for merchant wire products continues to be affected seasonally.

Chicago — Steel wire demand continued slow last week, restricted consumption bringing only small purchases for immediate needs. While consumers are expected to restrict forward ordering, a moderate gain in sales is looked for this month. Manufacturers' wire continues relatively more active than merchant wire products.

Boston — During the current decline in finishing operations, a few orders have been placed for shipment this month, although no backlog of size has been accumulated. Demand is well diversified, but consumption by several of the largest industries using wire in fabrication is small. Demand for wire rods is slack. Inventories on some specifications are still large, with others well worked off, consumer stocks in numerous instances being unevenly balanced.

New York — Wire orders booked for first quarter shipment are not impressive and few consumers have anticipated full requirements during that period. Some tonnage for delivery this month is appearing, but the character of orders indicates a continuance of buying for immediate needs. Finishing department operations will be increased slightly by some eastern producers this week after being practically down during the holidays. Backlogs, however, are not large and the diversified character of small specifications makes it difficult to schedule sustained operations on any one item. The extent of improvement depends largely on consumer operations and to the depth inventories have been lowered.

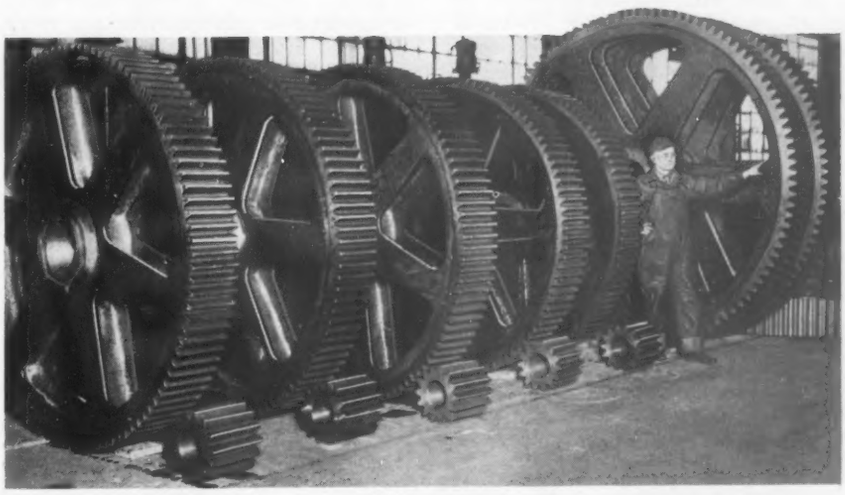
Pipe

Pipe Prices, Page 337

Cleveland—Requirements for steel pipe from domestic and industrial channels has been retarded considerably, due to the holidays. Jobbers report total tonnage booked during December fell considerably below the preceding month and the comparable period in 1936. Cast iron pipe foundries are fairly busy for this time of the year and look forward to a substantial improvement during the next few months as PWA work expands. Prices are steady.

Chicago—While cast iron pipe business showed a moderate increase during 1937, sellers anticipate a drop of around 20 per cent during the new year. Government funds available

RELIANCE
SOUND
STEEL CASTINGS



Gears in a customer's shop cut from steel castings poured in the Reliance foundry. A few of many gears cast from these patterns—each sound and solid throughout, and all homogeneous.

Gear blanks, the most explored of all castings by machining, are a specialty with Reliance.

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This experience or "know-how" demanded by this type of production certifies that all other Reliance castings are equally sound.

We recommend that you order Reliance "sound" castings. They mean freedom from rejections, lower production costs in your shop, and **uniform heat treating quality.**

RELIANCE
Steel Casting Co.

27th to 28th & Smallman Sts.
PITTSBURGH, PA.

Since 1898

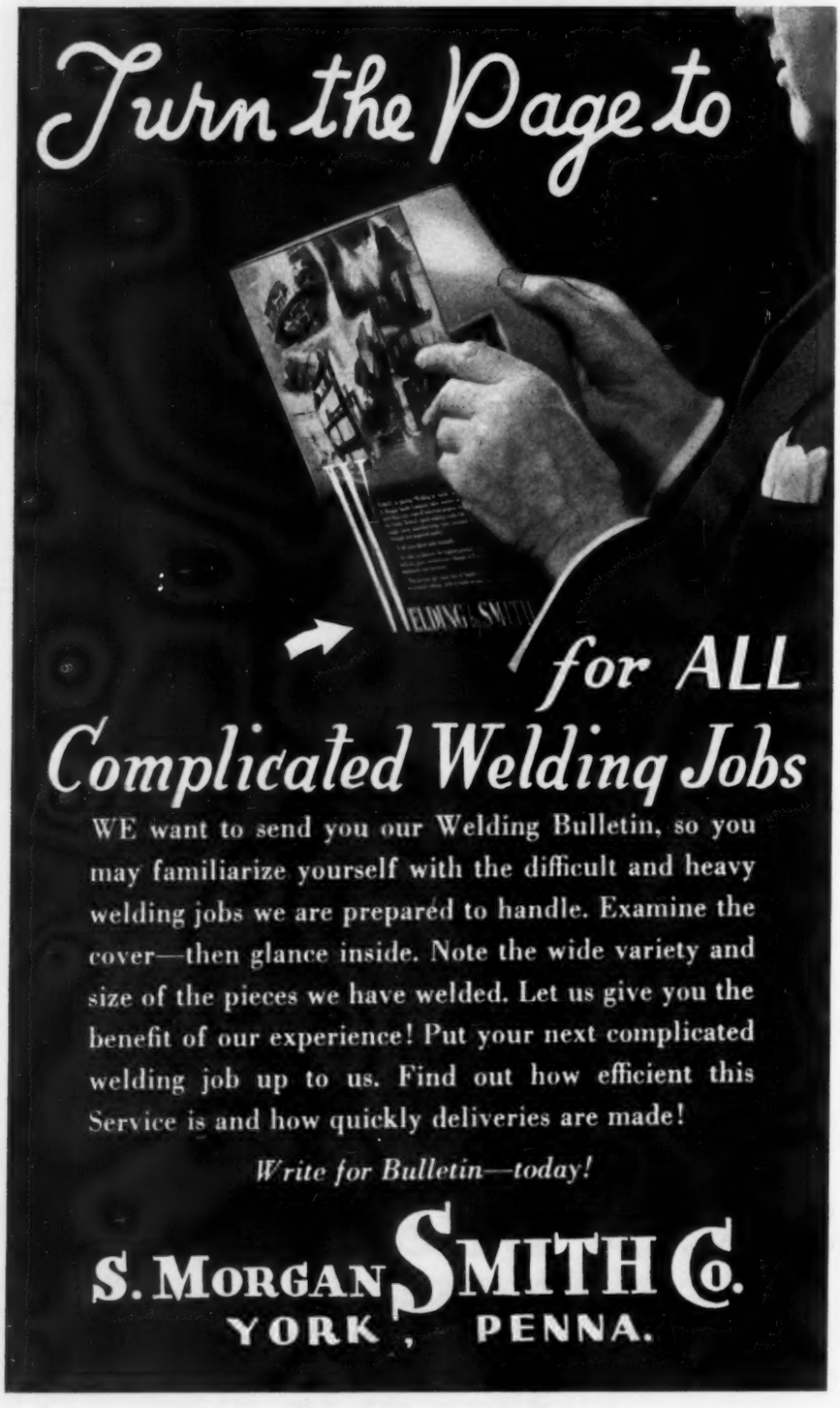
for municipal work in 1938 will be small, according to present indications, and larger cities are expected to find it unnecessary to make large extensions to water distributing facilities.

Boston—Cast pipe inquiry during the next few weeks is expected to be light with buying confined to miscellaneous fill-in needs. Several large projects will be out for estimates for spring delivery, although Boston is not expected in the market before June. Utility purchases in 1937 were well below normal. Small-sized galvanized steel pipe is slightly more active.

New York—Some routine contracting at the newly reaffirmed prices is noted in steel pipe, although specifications are still coming out slowly, reflecting seasonal influences. Sellers here see little ahead until weather moderates and construction work becomes more active. Resale prices are somewhat firmer.

Bids are in on several procurement division inquiries, mostly small, a 140-ton lot for Newark being outstanding. New York city also has figures on 340 tons, 12-inch, the final purchase of the 1937 to be followed by a large inquiry early in the year. Prices quoted at public lettings recently have been slightly lower. Miscellaneous buying has been off, but is expected to improve soon.

Seattle—Spokane opened bids Dec. 23 for about 200 tons of 8 and 12-inch cast iron, and Bremerton, Wash., will receive bids soon for 328 tons of 12-inch. Other Pacific Northwest cities are considering improvements and suppliers expect an improved demand early in 1938. Silver Lake district, Snohomish county, Wash., has called bids Jan. 3 for a water system for which a $26,182 PWA grant has been made. Quantities involved include about 65,000 feet of 2 to 8-inch steel pipe.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WE want to send you our Welding Bulletin, so you may familiarize yourself with the difficult and heavy welding jobs we are prepared to handle. Examine the cover—then glance inside. Note the wide variety and size of the pieces we have welded. Let us give you the benefit of our experience! Put your next complicated welding job up to us. Find out how efficient this Service is and how quickly deliveries are made!
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S. MORGAN SMITH CO.
YORK, PENNA.

Cast Pipe Placed

750 tons, 20-inch and under, Esopus, N. Y., to United States Pipe & Foundry Co., Burlington, N. J. through contractor.

Cast Pipe Pending

3340 tons, 12-inch, cement-lined, New York city, bids in, department of purchase. Inquiry also includes 100 tons of fittings and 10,000 feet, 2-inch galvanized steel pipe.

328 tons, 12-inch for Bremerton, Wash.; bids soon.

200 tons 8 and 12-inch for Spokane, Wash.; bids in.

140 tons, 12-inch, procurement division, treasury department, Newark, N. J.; bids in.

Rails, Cars

Track Material Prices, Page 337

Added to the 1100 freight cars noted last week as pending for the Western Maryland are 2000 steel sheathed box cars for the Canadian National. Buying has been negligible. The Canadian National is featuring the locomotive market with an inquiry for six locomotives of the 6400 type and 24 snow plows. This railroad is also inquiring for 21 coaches.

While not substantiated by actual inquiries, there are growing expectations of a sharp increase in railroad demand for track material and equipment this quarter. Only a few rail inquiries are pending but a number of roads have prepared budgets of tonnages likely to be bought this year and from present indications the volume of buying will compare favorably with that of 1937. Some effort is thought likely to be made to speed equipment buying in order to provide some mo-

mentum to general industrial activity.

Car Orders Pending

Canadian National, 2000 steel sheathed box cars and 10 combination sleeping and cafe cars, six diners and five mail and express cars, bids asked.

Locomotives Pending

Canadian National, six 6400-type locomotives and 24 snow plows, pending.

Shapes

Structural Shape Prices, Page 336

New York—New inquiry is coming out in excess of recent buying, which has been light. Public works and an increased number of small bridges account for a good part of the gain. Several apartment houses are also up for estimates. Bids are in on a 5830-ton railroad bridge, Long Island. Prices quoted on fabricated structural material in place are inclined to be softer.

New business booked by the structural steel fabricating industry in November was the largest in volume since last July according to the American Institute of Steel Construction. Both bookings and shipments for the month, however, were slightly lower than the average for the year. November bookings were 58.4 per cent of normal, (yearly average for 1928-31, inclusive), as against a monthly average for the first eleven months of 1937 of 59 per cent. Shipments during November were 55 per cent of normal, as against a monthly average of 60 per cent for the first eleven months of the year.

Boston — Two projects, taking 650 tons, bridge, Norwich, Conn., and a medical center building, Boston, account for the bulk of structural steel booked. There are few large-tonnage projects active, a surgical building, Massachusetts General hospital, Boston, excepted. There

Shape Awards Compared

	Tons
Week ended Jan. 1	8,835
Week ended Dec. 25.....	10,740
Week ended Dec. 18	19,109
This week, 1937	33,736
Weekly average, 1937.....	23,281
Weekly average, 1938.....	8,835
Weekly average, December	13,591
Total to date, 1937.....	33,736
Total to date, 1938.....	8,835

Includes awards of 100 tons or more.

You Can't Quarantine A State!

Neighboring States Have the Bad Habit of Following Footsteps of States Fostering Confiscatory Labor Relations And Regulations.

Owners of idle or nonproductive plants in these states often are not only unable to realize anything from the dismantlement of such idle buildings or equipment but are forced to pay someone to remove them since the WORKMEN'S COMPENSATION PREMIUM ALONE IS LIKELY TO BE GREATER THAN THE SALVAGE VALUE OF THE PLANT.

In several recent instances negotiations for the purchase of plants were actually underway or completed before either the owner or purchaser were aware of such discriminatory regulations in their states. Insurance premiums on dismantling jobs in these states are no longer figured on a payroll basis, but on a cubical content basis that makes no allowance for method of procedure, the number of men employed, or the amount of payroll expended.

STORM WARNING!

Ohio, among other states, is giving consideration to the adoption of this absurd rule, and should its adoption become general, the best the owners of nonproductive plants can hope for is a fire or a tornado. The writers of Public Liability Insurance are already falling in line by calculating their premium on the same basis. This Public Liability premium, to our knowledge, in some instances equals fifty (50) percent of the estimated payroll—TEN TIMES GREATER THAN IT WOULD BE AT THE HIGHEST POSSIBLE RATE FIGURED ON THE USUAL PERCENTAGE BASIS.

Ninety percent of all nonproductive plants eventually yield their owners less than a dismantlement would if made immediately upon its abandonment. Even the plants that are eventually sold to new owners as an operating plant show a less return than a dismantlement would have. The combination of taxes, insurance, maintenance, watchmen service, loss by pilfering, corrosion, depreciation and obsolescence will eat up the value of any idle unit in a few years.

DISMANTLEMENT IS THE REMEDY for the majority of idle plants. The steel industry is peculiar in that its executives have the courage to realize these conditions and acts before these uncontrollable expenses completely destroy the investment of their idle units.

Without obligation we will be glad to make a proposal covering the dismantlement of your idle units, based on the several different methods we have developed, allowing the greatest possible recovery for the owners.

HETZ CONSTRUCTION CO., INC.

Phone 4474 **Griswold St.** **Warren, O.**

are, however, more individual inquiries, mostly public work with schools leading. Low prices on fabricated structural material prevail.

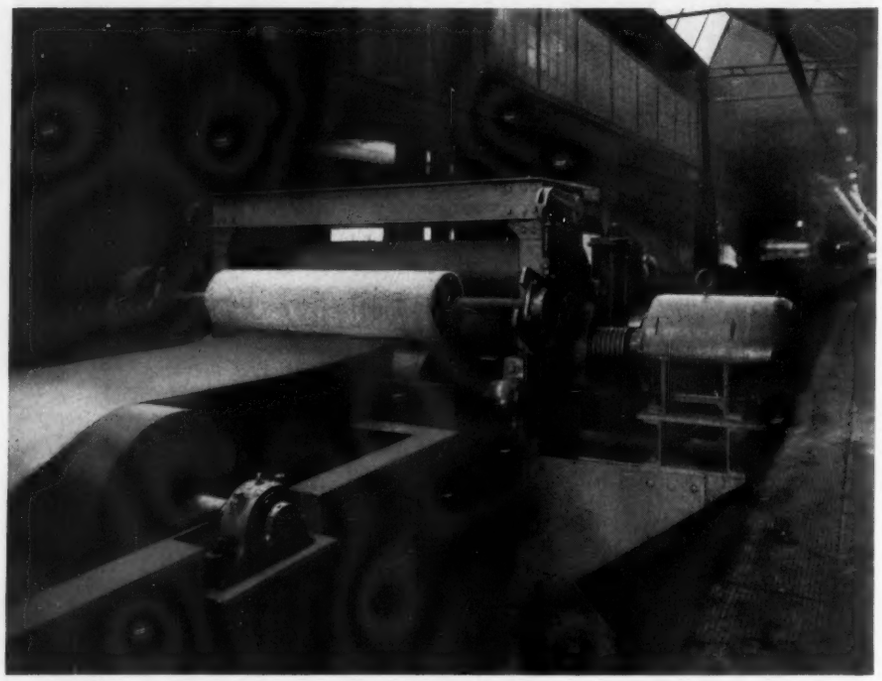
Philadelphia — Approximately 10,000 tons of structurals remain to be placed within the next few weeks. Considerable interest is evidenced in the farm show building, Harrisburg, which is expected to go to McCloskey & Co., Philadelphia, low bidder. The 2500-ton Potomac river job at Hancock, Md., also represents immediately pending work for fabricators. Several hundred tons still are to be bought for a few private jobs. Mill prices on shapes hold firm, but close competition for fabricated material continues.

Cleveland — Most producers of structural steel anticipate a gradual improvement in demand through January. It is expected that many projects now being held up will begin to come out for bids within the next 30 days. State work continues to dominate current requirements. Fabricated prices are spotty but mill quotations remain firm.

Chicago — Fabricated structural steel awards and inquiries hold in the restricted volume of recent weeks. With few exceptions, fabricators have only a small volume of unfilled business and operations reflect the condition of order books. Plain shapes are moving slowly to railroad shops and car builders.

San Francisco — New inquiries for structural shapes continues to come forth slowly and awards do not exceed 1500 tons. The most important lettings included 1000 tons H columns for the 1938 tunnel beams requirements of the metropolitan water district, Los Angeles.

Seattle—Demand for structurals is more active than other steel items and important tonnages are to be realized within the next month. Poole & McGonigle, Portland, Oreg., have the subcontract for 220 tons of shapes involved in a state bridge, Wahkiakum county, Washington.



Spiral Wound **BRUSHES**

SPEEDIER production and a better finish of light gauge steel and continuous strip tin plate are obtained through "Even Trim" Spiral Wound Brushes.

They are made of nickel-silver wire, horsehair or tampico for various types of finishes. And all are refillable—for economy and to insure uninterrupted production.

Our engineering representatives will be glad to work with you in the development of Spiral Wound Brushes to meet your specific needs. Write or telephone—today.

PITTSBURGH
PLATE GLASS COMPANY
BRUSH DIVISION · BALTIMORE, MD.

Shape Contracts Placed

1100 tons, bridge, Lafayette avenue, Bay City, Mich., to R. C. Mahon Co., Detroit.

1000 tons, tunnel ribs, 6-inch 20 and 30-pound H columns, metropolitan water district, Los Angeles, to Bethlehem Steel Co., Los Angeles.

595 tons, wharf and warehouses, Beaumont, Tex., to Petroleum Iron Works Co., Beaumont.

475 tons, bascule bridge, Galveston, Tex., to Wisconsin Bridge & Iron Co., Milwaukee.

450 tons, plant and garage building, Coca Cola Bottling Co., Pittsburgh, to Bethlehem Steel Co., Bethlehem, Pa.

395 tons, industrial building, Eastern pennitentiary, Gratersford, Pa., to Belmont Iron Works, Philadelphia.

380 tons, highway bridge, Port Royal, S. C., to Vincennes Steel Co., Vincennes, Ind.

365 tons, bridge, Shetucket river, Norwich, Conn., to Harris Structural Steel Co., New York; N. Benvenuti & Sons, New London, Conn., general contractor.

345 tons, addition, steam generating plant, Baton Rouge, La., to Virginia Bridge & Iron Co., Birmingham; Stone & Webster Engineering Corp., Boston, general contractor.

285 tons, building, Pratt Diagnostic hospital, medical center, Boston, to A. O. Wilson Structural Co., Cambridge, Mass.

275 tons, crane runways, water and power department, Los Angeles, to Bethlehem Steel Co., Los Angeles.

270 tons, Tyon street bridge, Colorado Springs, Colo., to Kansas City Structural Steel Co., Kansas City, Mo.

260 tons, factory addition, Dayton, O., to Burger Iron Co., Akron, O.

260 tons, state highway bridge AD-41-220, Peebles, O., to Bethlehem Steel Co., Bethlehem, Pa.

230 tons, state highway bridge, contract 1588, Corydon, Ind., to Midland Structural Steel Co., Cicero, Ill.

220 tons, bridge, Columbia county, route 183, to Bethlehem Steel Co., Bethlehem, Pa., through H. R. Dickens, Philadelphia.

220 tons, state bridge Wahkiakum county, Washington, to Poole & McGonigle, Portland; The Mirene Co., Portland, general contractor.

200 tons, state viaduct over Chicago & North Western railroad, 266-A, Crowell, Nebr., to Illinois Steel Bridge Co., Jacksonville, Ill.

195 tons, hospital, Elizabethtown, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

185 tons, coal bunker, Ruppert brewery, 92nd street and Third avenue, New York, to Post & McCord, New York; Hughes Contracting Co., general contractor.

180 tons, school addition, Caledonia, N. Y., to F. L. Heughes & Co., Rochester, N. Y.

160 tons, bridge RI-13-53, Ohio, to Mt. Vernon Bridge Co., Mt. Vernon, O.

155 tons, bridge 149.57, Michigan, to American Bridge Co., Pittsburgh.

150 tons, junior and senior high school building, Davidsville, Pa., to Griffith-Custer Steel Co., Johnstown, Pa.

140 tons, specification 981-D, American canal, Nevada, to Pacific Iron & Steel Co., Los Angeles.

125 tons, building addition U. S. Gypsum Co., Philadelphia, to Roy A. Robinson, Philadelphia.

115 tons, bridge WPH-493-C, Henry county, Georgia to Virginia Bridge Co., Roanoke, Va.

105 tons, administration building, Carnegie Institute, Washington, to Barber & Ross, Washington; James Stewart & Co., New York, general contractor.

Unstated, 35 railway mine cars for Peruvian mining interests, to unnamed Tacoma fabricator.

Shape Contracts Pending

2500 tons, public school No. 10, Queens, N. Y.

2300 tons, building for sludge filter incinerator, Detroit.

2170 tons, Farm show building, Harrisburg, Pa.; McCloskey & Co., Philadelphia, low on general contract. Previously reported Dec. 13.

1500 tons, Central library building, Brooklyn, N. Y.; Cauldwell-Wingate Co., New York, low, bids Dec. 23.

1200 tons, steel transmission towers and accessories, Watts Bar-Alcoa 154 kv transmission line, bids Jan. 6, Tennessee Valley Authority, Knoxville, Tenn.

1000 tons, bridge, Kanawha boulevard, Charleston, W. Va., for city of Charleston.

350 tons, court house, Ashville, O.

315 tons, Madison avenue bridge at Exterior street, New York; Knight & Timoney, Inc., Bronx, N. Y., low, bids Dec. 23.

290 tons, naval hangar, Sand Point, Seattle, Milwaukee Bridge Co., Milwaukee, low.

280 tons, store building, S. S. Kresge Co., Springfield, Mass.

255 tons, Wilson Canyon bridge, Coconino county, Arizona; bids opened.

255 tons, bridge, Clarksdale, Ariz.

250 tons, Flagstaff, Ariz.

235 tons, Long Beach mainline-Pacific Electric railway bridge, United States engineer office, Los Angeles; Lakeside Bridge & Steel Co., Milwaukee, low.

230 tons, power station, Kansas Electric & Power Co., Lawrence, Kans.

225 tons, Centinela avenue bridge, Culver City, Calif.

200 tons, gin building and seed house, Holdenville, Okla.

200 tons, power house, Lawrence, Kans.

190 tons, under-crossing, Union Pacific tracks near Pico, Los Angeles county, California; bids opened.

170 tons, state bridge FAGH-SS-38-1, Cheektowaga, Erie county, New York.

150 tons, Northern Pacific railway warehouse for International Harvester Co., Spokane, Wash.; bids soon.

140 tons, storage cellar, Old Reading brewery, Reading, Pa.

125 tons, substation structure for Seattle light department; Seattle Boiler Works recommended for award.

120 tons, library building, Morgan college, Baltimore.

120 tons, bridge, Lower Canada boulevard, Los Angeles county, California, for U. S. government.

110 tons, religious school, Rodef Sholom congregation, Pittsburgh.

108 tons, bridge near Sanger, Fresno county, California; bids Jan. 5.

105 tons, two new end spans, Lower Canada boulevard bridge, bids in to U. S. engineer, Los Angeles.

105 tons, Calapooya river bridge, Linn county, Oregon; bids Jan. 7.

100 tons, under-crossing near Hudell Station, Los Angeles county, California; bids Jan. 13.

100 tons, state highway bridge RC-3501, Fonda, Montgomery county, New York.

Unstated tonnage, additional buildings, Norristown state hospital, bids Jan. 21.

Reinforcing

Reinforcing Bar Prices, Page 337

New York — Concrete bar prices, 2.84c, delivered, job, will be subjected to a test this week, bids being in on approximately 2500 tons

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Good Used Equipment First

Immediate Availability and Delivery
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AIR COMPRESSORS
250 cu. ft. 12″x18″ Sullivan Type WG-6, Belt Driven. 30 lbs. Working Pressure
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752 cu. ft. 16″x9¾″x10″ Sullivan Type WN-3, Motor Driven. 100 lbs. Working Pressure
868 cu. ft. 17″x10¼″x12″ Sullivan Type WM-3i Motor Driven. 100 lbs. Working Pressure
1300 cu. ft. 22″x13″x16″ Ingersoll Rand 10-B-2 Belt Driven. 100 lbs. Working Pressure
1573 cu. ft. 22″x13″x14″ Sullivan Type WN-3 Motor Driven. 125 lbs. Working Pressure
2678 cu. ft. 28″x17½″x21″ Ingersoll Rand PRE-2 Motor Driven. 100 lbs. Working Pressure

CHARGER
Alliance Floor-Type Ingot Charger

DOUBLERS
Wean Type 2-Roll Mechanical Doubler, Capacity 3 No. 16 gauge sheets. 52″x40″ to 120″ long
Hyde Park Fdry. & Mach. Co. Combination Doubler & Shear, Motor Driven. Knife 42″x1″x3½″

FURNACES
3 ton Snyder, Complete with Electrical Equipment
750 lb. Detroit Type SAA, Motors & Electrical Equipment 440/3/60. Kuhlman Transformer 125 KVA, 60 cycle, single phase
1500 lb. Detroit Type BB, Motors & Electrical Equipment 440/3/60. Kuhlman Transformer 250 KVA. Single Phase

GENERATING SETS
343 KVA General Electric 2300 v. 3 ph. 60 cy. Connected to 400 HP Rathburn Oil Engine
625 KVA General Electric 2300 v. 3 ph. 60 cy. Coanected to Ingersoll Rand Oil Engine
800 KW 330 Volt D.C. Generators Connected to 1200 HP McIntosh & Seymour Vertical Eight Cylinder Diesel Oil Engines
1250 KW General Electric Turbo Generator 2300 V. 3 ph. 60 cy. Condensing type with direct connected 125 volt Exciter
4000 KW General Electric Turbo Generator 4500 V. 3 ph. 60 cy. A Compiete Unit

LEVELLERS—ROLLER
40″ Hilles & Jones, Motor Dr. ½″ Capacity
50″ National 17-Roll, Diameter Rolls 3⅝″
60″ National 17-Roll, Diameter Rolls 4½″
60″ Newbold 11-Roll, Arranged for Motor Drive. Capacity 3/16″ Plate

ROLLING MILLS
8″x4½″ Blake & Johnson Single Stand Two High
4″x5″ Torrington Single Stand Two High
8¼″x10″ Belgian Three Stand Two High
9″x10″ Columbia Two Stand Two and Three High
9″x14″ Cramp Single Stand Two High
9″x14″ Columbia Two Stand Two and Three High
10″x12″ Single Stand Two High Finishing Mill
12″x15″ Mackintosh Hemphill Single Stand 2-High
12″x16″ Phila. Single Stand Two High
14″x24″ Hill Clutch Two Stand Two High
15″x38″ Waterbury Farrel Single Stand Three High Rod Mill, Motor Driven. Capacity Round Bars 1⅜″ down to ⅜″
20″x30″ Birmingham Two Stand Two High
22″ Lewis Three High Bar Mill, Complete with electric driven feed and tilting tables, runout tables, bull head electric driven thru Faweus Gear. Electric driven Pusher for cooling table
Train of Six 30″ dia. Two High Hot Sheet Mill Complete with Hot Mill Drive Motors, Regulators, Controls, Speed Reducers

CRANES
Overhead Electric Traveling
Numerous Cranes Available In Various Capacities and Spans. Both A. C. and D. C. Motors
35 ton McMyler Steam (Oil Fired) Traveling Crane 70′ Boom, 15′ Between Legs, 22′ Portal
Link Belt 2 Yard Steel Traveling Crane 100′ Span, 40′ Cantilever, 45′ Lift, 150′ Length Overall

LOCOMOTIVE
90 ton St. Louis Car Co. General Purpose Electric Locomotive. Equipped for self-contained internal power. Straight trolley or third rail operation on 750 or 1500 volts

MILL MOTORS
2500 H.P. G.E. 2200 v. 3 ph. 60 c. 240 RPM
300 H.P. G.E. 2200 v. 3 ph. 60 c. Slip Ring

PICKLERS
22″ Mesta Low Type Four Arm Air Balanced, Steam Operated. Total Lift 7′3″
22″ Mesta Patented Low Type Three Arm, Steam Operated. Lift 5′3″, Radius 7′9″

PUMPS—HYDRAULIC
1¼″x10″ Worthington Vert. Triplex, M.D. Capacity 12 GPM., 2000 lbs. Pressure
5″x12″ Aldrich Vert. Triplex, M.D. Capacity 150 GPM., 1500 lb. Pressure
3″x18″ Worthington Hor. Duplex, M.D. Capacity 125 GPM., 2000 lb. Pressure
3⅝″x12″ Worthington Hor. Duplex, M.D. Capacity 150 GPM., 1500 lb. Pressure
3½″x18″ Worthington Hor. Duplex, M.D. Capacity 200 GPM., 2500 lb. Pressure

ROLL—PLATE STRAIGHTENING
Hilles & Jones, Arr. for M.D. Six Rolls 13¾″ dia. 10′6″ Between Housings. Capacity 1″ Plate

ROLL—TAPER FORGING
No. 1 Ajax, Belt Driven. With Shear Attachment

SHEAR—BAR
No. 10 Buffalo Special Armor Plate. Cap. 3½″ Round, 3½″ Square, Angles 8″x8″x¾″, Flats 8″x1¼″

SHEET STRIP COILING MACH.
United Engr. & Fdry. Co., M.D. Capacity 48″ wide min. from gauge .020 to .100. Produces col 24″ dia. Equipped with tail kicking device and coil ejector

SLITTER
No. 36-G Yoder, Motor Driven. Capacities 5 cuts. No. 11, 11 cuts. No. 14, 15 cuts. No. 16, 18, 20, 22 and 24 gauge

STRAIGHTENERS
No. 0 Medart Straightening, Polishing & Sizing Machine. Multiple V Belt Drive. Timken Roller Bearings. Capacity, Bars ½″ to 1½″ dia. incl. any length. Installed new July, 1937
No. 1 Sutton-Abramson Round Straightening Machine Cap. Bars ⅜″ to 1½″ dia., Tubes ⅝″ to 2″ O.D.
No. 2 Sutton, Timken equipped thruout, with enclosed helical gear drive, forged steel rolls. Capacity ⅝″ to 4″ inclusive
7-Roll Straightener, for straightening angles, beams, channels, tees, zees. Arranged for motor drive. Capacity angles 2″x2″ to 6″x6″. Rolls adjustable vertically and horizontally

TESTING MACHINES
30,000, 50,000, 100,000 and 150,000 lb. Olsen and Riehle Bros. Universal Motor Driven

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Liquidations— Bona Fide Auction Sales Arranged— Entire or Surplus Mfg. Equipment Inventories Purchased

of new work, including 1500 tons, Long Island railroad bridge. On a recent tonnage for WPA work, the price failed to hold. Awards include 550 tons for a museum addition.

Boston — Reinforcing steel buying is stagnant and the type of construction work now active includes few sizable inquiries. Most purchases are for lots of 25 tons and under. On this type of business, 2.95c, delivered job, appears to be holding.

Bids close Jan. 10 on first quarter requirements of five boroughs, New York City, PWA needs, with procurement division treasury department, requiring approximately 1500 tons.

Philadelphia — Some half dozen public jobs involving several hundred tons each are pending. In several cases, the steel probably will not be placed by the general contractors for several weeks, since construction will not be started until spring and the inclination to take a closer view of prices still is evident.

Cleveland—Awards during December were estimated to be the lowest for any month last year. Most fabricators operated on reduced schedules throughout the month. However, some improvement is expected during January with confidence returning and opening up new projects temporarily shelved. Mill prices remain firm with no recent test reported on fabricated material out of jobbers' stocks.

Chicago — Concrete bar orders for schools in nearby cities total 845 tons. Other awards generally are small and the amount of pending business has declined from the volume of the past several months. New inquiries are slower and the immediate outlook is less favorable. Reinforcing bar prices have been reduced $2 a ton, the market on billet bars now being 2.50c, with rail steel bars 2.35c, Chicago.

Seattle—End of the year finds rolling mills idle, with no backlogs and immediate prospects not encouraging. School projects are numerous in the Pacific Northwest but involve only small tonnages. Less than 1000 tons are pending in state road projects awarded or up for figures. Subject to WPA approval, Seattle has awarded the Henderson street sewer job to Queen City Construction Co., Seattle, at $249,399, involving 6645 feet of 60-inch monolithic reinforced concrete pipe.

San Francisco — The most active market of the week was reinforcing bars with 2421 tons placed, bringing the aggregate for the year to 98,820 tons compared with 231,604 tons in 1936. LaClede Steel Co. apparently, is low bidder on 4193 tons for the United States engineer office, Los Angeles.

Reinforcing Steel Awards

1500 tons, completion of main control shafts for Fort Peck tunnel, invitation No. 1, for army engineers' office, Missouri river division, to Sheffield Steel Corp., Kansas City.

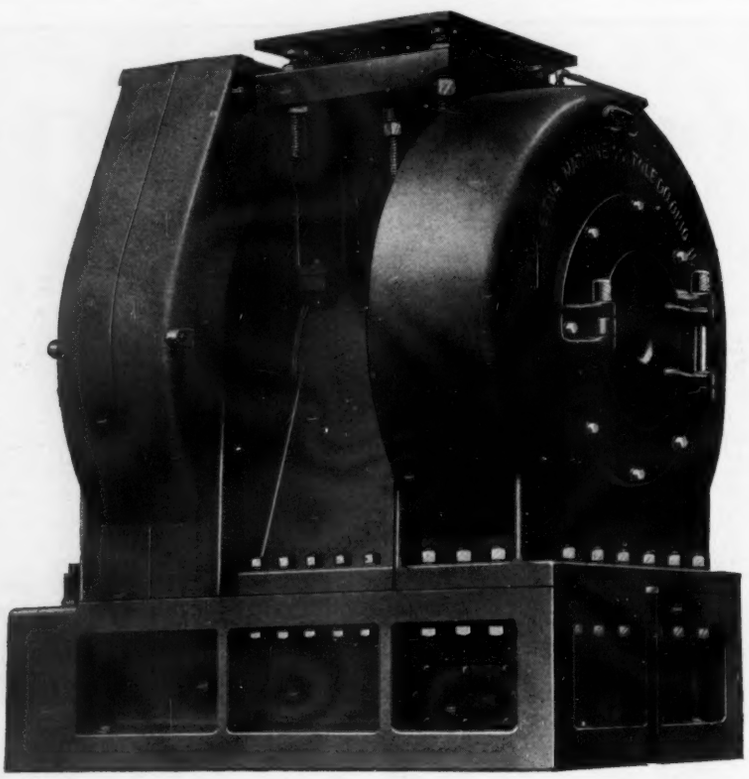
500 tons, Pulaski high school, Milwaukee, to Joseph T. Ryerson & Son Inc., Chicago.

250 tons, Saks Fifth avenue department

Concrete Bars Compared

	Tons
Week ended Jan. 1	3,419
Week ended Dec. 25	4,939
Week ended Dec. 18	5,418
This week, 1937	465
Weekly average, 1937	6,266
Weekly average, 1938	3,419
Weekly average, December	4,111
Total to date, 1937	465
Total to date, 1938	3,419

Includes awards of 100 tons or more.



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New Etna
SWAGING MACHINES

These recently introduced models are new in performance, as well as design . . . but older Etna standards of quality material, expert workmanship and rugged construction have been retained.

Adapted for hot or cold work, the complete circulating system is an integral part of the machine. Built in 2, 3 and 4 inch capacities—with die length of 4 to 18 inches. Smaller models down to 3/8 inch capacity . . . and larger ones built to order up to 10 inch diameter. All are equipped with Timken bearings.

Model 312, with a capacity of 3 inches and die length of 12 inches, is shown above. WRITE TODAY. Let us show you how the *New Etna Swaging Machines* can solve your problems.

The ETNA MACHINE Co.
3400 MAPLEWOOD AVE. TOLEDO, OHIO

store, Beverly Hills, Calif., to unnamed interest.

245 tons, high school, Niles Center, Ill., to Calumet Steel Co., Chicago.

185 tons, bridge, Lafayette avenue, Bay City, Mich., to Truscon Steel Co., Youngstown, O.

150 tons, first unit Goodwill Industries, Los Angeles, to unnamed interest.

138 tons, high school, Monte Bello, Calif., to unnamed interest.

131 tons, two buildings, high school, San Bernardino, Calif., to unnamed interest.

120 tons, men's dormitory, Howard university, Washington, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, Wahkiakum county state bridge, Washington, to unstated Portland interest; Mirene Co., Portland, general contractor.

100 tons, grade school, Joliet, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

Reinforcing Steel Pending

4193 tons, proposal 171, United States engineer office, Los Angeles; Laclede Steel Co., Los Angeles, low.

1000 tons, coliseum, Vernon, Calif.; bids soon, plans being prepared.

750 tons, barracks and warehouse, Hickam Field, T. H.; bids opened.

600 tons, pump and blower house, Tallmans Island sewage treatment works, contract 3, Queens, N. Y.; Caye Construction Co., New York, low, bids Dec. 23, department of sanitation, New York.

500 tons, broadcasting station, Sunset boulevard near Vine street, Hollywood, Calif.; Austin Co., Cleveland, general contractors.

420 tons, Farm show building, Harrisburg, Pa.; McCloskey & Co., Philadelphia, low bidder.

200 tons, store building, Oak Park, Ill.

140 tons, roadways, underpass and reconstruction of present approach to Madison avenue bridge at Exterior street, New York; Knight & Timoney, Inc., Bronx, N. Y., low, bids Dec. 23.

134 tons, highway work in Chaffee county, Colorado; bids opened.

100 tons, Sweetwater river bridge, National City, San Diego county, California; bids Jan. 7.

100 tons, widening bridges, three, Los Angeles county, California; bids Jan. 13.

100 tons, bridge, Elkhart county, Indiana.

100 tons, research building, Procter & Gamble Co., Cincinnati, general contract to Ferro Concrete Construction Co., Cincinnati.

Pig Iron

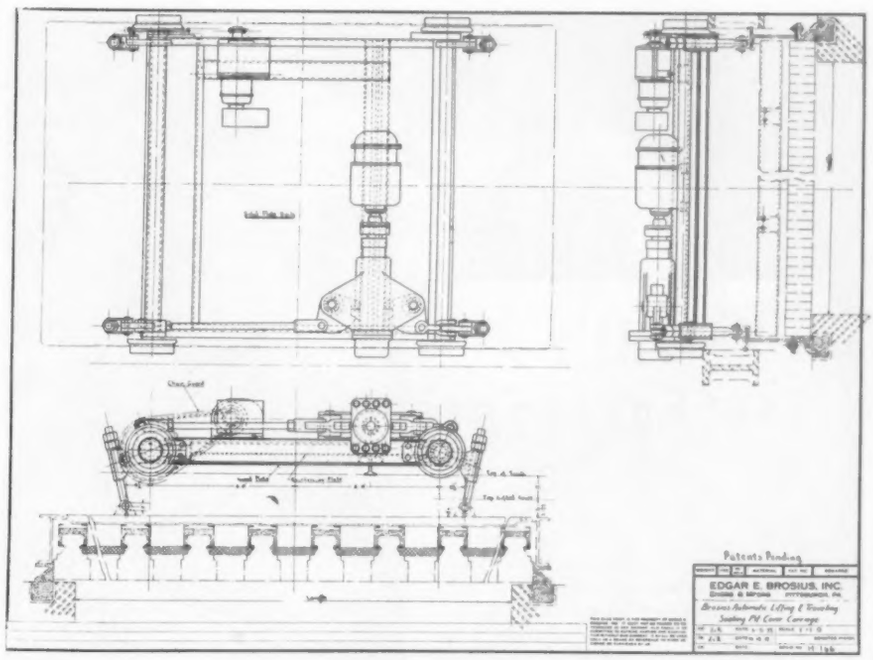
Pig Iron Prices, Page 338

Cleveland—One seller booked a surprising number of orders for shipment over the last few days of December. Apparently some foundries wanted to fill in depleted stocks preparatory to resumption of activity after the first of the year. However, despite the slight improvement at the end of the month, December is reported to be the poorest month during 1937, far below March the best month of the year.

Boston—Pig iron sellers have booked little tonnage for first quarter, notably true of malleable. Buying is limited to scattered lots with foundry melt still sharply curtailed in most instances. Until melters experience an increase in demand for castings, few are expected to anticipate requirements or cover much in advance.

Chicago — Some small lots of pig iron are being ordered by foundries which have permitted stocks to decline. A number of foundries, however, have sufficient iron due them against old contracts to make it unnecessary to enter the market for additional supplies. A small increase in consumption is in prospect this month, some plants which were closed over the year end planning to resume operations shortly. Pig iron consumers are not pressing for lower prices, in some instances fearing that a reduction in raw material will be reflected in prices of manufactured products. The market is steady at $24, furnace, for No. 2 foundry and malleable.

New York — Except for some of the larger consumers, buyers of pig iron have relatively light stocks on hand, and should there be any noticeable improvement in demand



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TWO MOTOR AUTOMATIC LIFTING AND TRAVELING CARRIAGE FOR SOAKING PIT COVERS

The cut above shows a diagrammatic drawing of the Brosius Cover Carriage. By means of automatic control the cover is first lifted then traveled off the pit. Reversing the control, travels the cover back over the pit, and, when a predetermined point is reached, a palm operated button is pushed, stopping the carriage and lowering the cover onto the pit.

The lifting of the cover and the travel of the carriage are accomplished through individual gear motors.

The carriages are made to suit any type of cover and can be arranged to suit any existing condition.

OTHER PRODUCTS

Steam, Hydro-Electric, and Electric-Mechanical Clay Guns, Cinder Notch Stoppers, Hand and Motor Operated Goggle Valves, Flue Dust Conditioners, Blast Furnace Slag Granulating Machines, Single Hook Grab Buckets, Automatic Dump Buckets, Automatic Single Hoist Grab Buckets, Overhead and Auto Floor Charging Machines for serving Heating and Melting Furnaces, Auto Floor Manipulators for serving Steam Hammers, Presses, etc.

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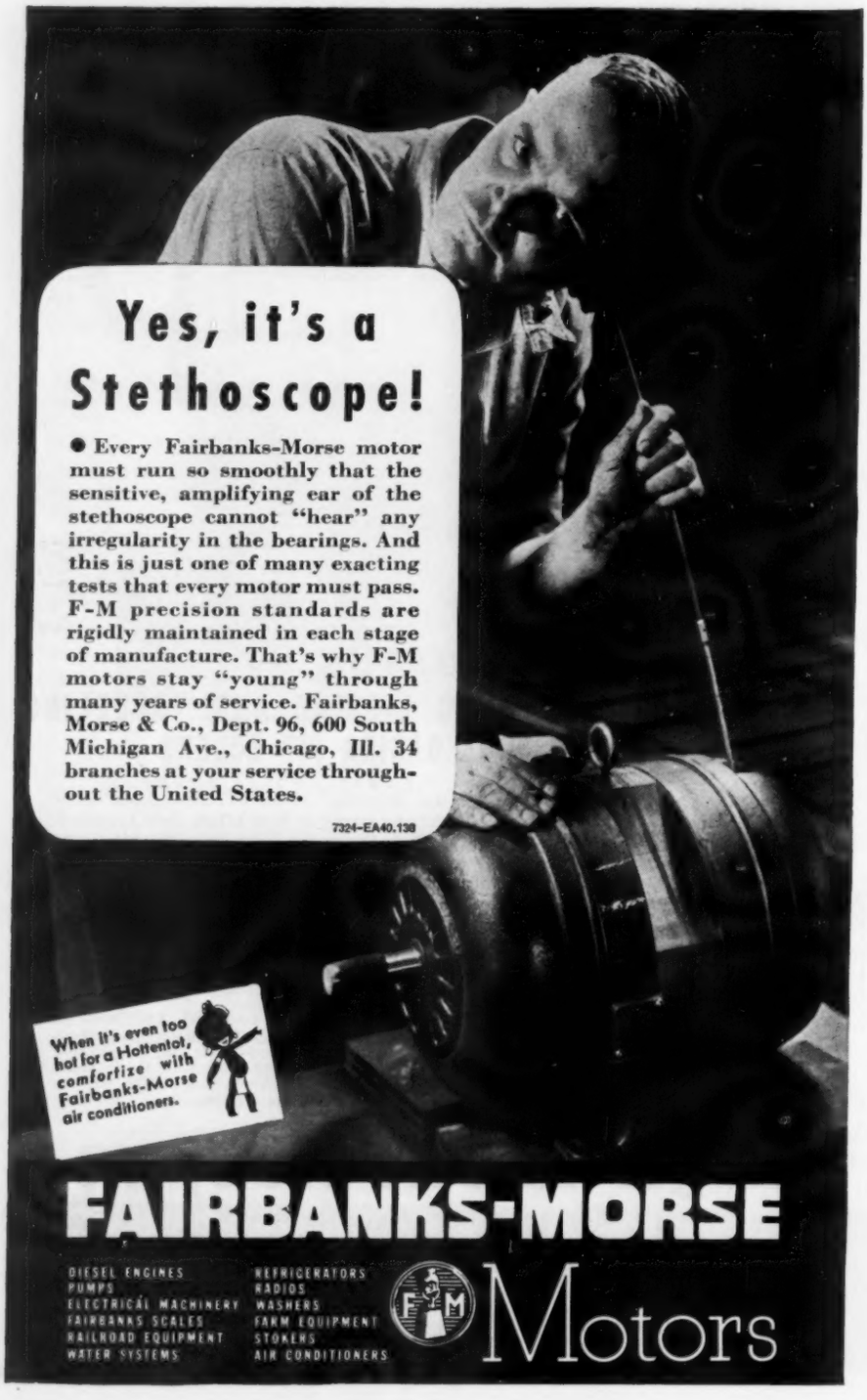
for their products, an early resumption in pig iron buying would follow. Most sellers look for some improvement by mid-January following inventory. Export inquiry is confined chiefly to small lots, with no outstanding tonnage being placed abroad since the award of 50,000 tons by Japan with southern furnaces, as noted last week.

Philadelphia — Pig iron sellers open the new year with relatively little business on books. Some of this represents carryover from fourth quarter. With the exception of the pipe trade, however, pig iron inventories are not heavy and a considerable upturn is anticipated before the month is out. In fact, not a few foundries had sub-normal inventories at the end of last week, even in view of current restricted operations. One of the large pipe makers is reported to have 25,000 tons of iron on hand or enough for 1938 requirements. Another interest is similarly well covered.

Buffalo — Pig iron shipments are confined to small lots. A gain in new buying is expected as foundries complete inventories. Seven out of fifteen stacks remain active but some producers report an accumulation of iron.

Cincinnati — Pig iron shipments during December were the lightest of the year. With some foundries down for inventory, and others on few heats, interest in new purchases has also lagged badly. The carryover, both on inventory and on contract, is considerable at recent melting levels. Prices of northern and southern iron are firm.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RADIOS
WASHERS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS
Motors

Scrap

Scrap Prices, Page 340

Pittsburgh — In expectation by the iron and steel scrap trade here that most of the old material offered by the Baltimore & Ohio will be taken by eastern bidders for shipment abroad, the market here on railroad specialties advanced moderately. A rise of 50 cents is noted in various grades.

Few brokers or dealers in this district are willing to talk business during the current dull week. All express preference to await the coming of the new year and then examine the trade signs narrowly. With all large consumers operating on reduced scales of activity, shipments of scrap at this time have been reduced materially.

The Pennsylvania has issued a list to close Jan. 5, including 3500 tons of No. 1 melting steel, 4600 tons No. 3 steel, 650 tons mixed borings and turnings and 1700 tons of car wheels.

Chicago—Scrap prices are steady but consumer buying has yet to follow the more active bidding by dealers and brokers the past several weeks. Some new business in heavy melting steel is looked for during January though the low rate of consumption is expected to limit purchases. Bids by sellers for this grade range up to $14, with the consumers' price nominal in the absence of sales.

Boston—Scrap prices which apparently touched bottom last month are showing additional strength despite lack of domestic buying. While there has been no general upturn, prices paid for export are firm with buying steady, but not active. District steel works are not taking additional scrap supplies, stocks being fairly large in most instances.

New York—Most scrap buying is for barge loading, export, brokers still paying $13.50 for No. 1 heavy melting steel. Domestic shipments are light, dealers paying $10.50 to $11 f.o.b. for No. 1 heavy steel scrap on the limited tonnage being moved,

although several eastern mills are taking some material. There have been no further price declines in the last two weeks and some grades are slightly stronger. Boat loading has materially reduced tonnage of scrap which accumulated on barges before the recent departure of several ships.

Philadelphia—Iron and steel scrap quotations holding at approximately the levels of the past two or three weeks in the absence of active consumer interest. Some No. 1 and No. 2 steel is moving at the respective quotations of $14.50 to $15 and $13 to $13.50. Machine shop turnings likewise are moving against an $8.25 order for a steelmaker in this district.

Foundry grades and steel specialties show little life. Two boats left late last month, one loaded by independent dealers for Italy and the second by brokerage interests for the United Kingdom. Export buying locally lags but No. 2 steel is being bought along the South Atlantic coast at $13 and $13.25, f.a.s., with differentials of $1 applying on No. 1 material.

Buffalo — The poor response of dealers to sell scrap at the compromise price arrangement has imparted a stronger undertone to the iron and steel scrap market. The movement of stock to mills, however, has increased to the best level in months. The principal consumer of the area, under the compromise offer has taken in about 15,000 tons of scrap during the last three weeks. Approximately 5000 tons was newly contracted for material, the remainder having been against orders of long standing.

Detroit — No change in a quiet scrap market here has appeared although feeling is general that buying has been so sharply restricted and inventories so completely used up that a partial resumption of buying is inevitable.

One steelmaker here was on the verge of closing his plant completely for the holidays, taking off all open hearths, but a last-minute decision changed these plans.

Cincinnati—The holiday season intensified dullness in the iron and steel scrap market. A stronger undertone was attributed to conditions in some other districts and to the turn of the year, which many dealers hoped would bring renewed buying. Mills, on restricted operations, have been eating into scrap inventories and found it unnecessary to enter the market. Yard dealers, who have been adding to stocks whenever prices were deemed advantageous, are holding material.

Seattle—No change is reported. Advices from Japan indicate that stocks are ample for present needs, only small lots being purchased under government restrictions. It is expected that by March new supplies will be required and letters of credit will be authorized. Some old orders have failed to receive import permits and shipments are delayed. Domestic demand is unimportant and prices are unchanged. Seattle will call bids soon for the sale of 300 tons of scrap steel rails from an abandoned street railway line of the municipal transportation system.

Warehouse

Warehouse Prices, Page 339

New York—Black sheets, 18 gage and lighter, have been reduced to 4.75c in lots under 10 bundles and 4.50c for over 10 bundles. The former warehouse price was 4.82c, three to 25 bundle orders. This follows a recent $5 reduction in galvanized. Warehouse volume in December was under that of November. Heavy sales during the first six months resulted in 1937 totals top-

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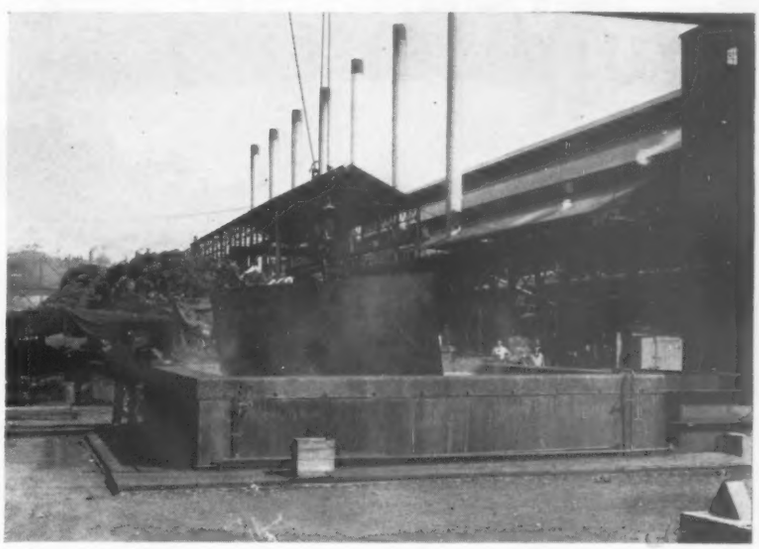

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The tank illustrated is out in the open and has been in continuous operation for 6 years without any repair expense whatsoever, and is only one of hundreds of tanks lined by the CEILCOTE method.

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Complete details furnished for lining tanks of wood, steel, concrete and brick construction.

THE CEILCOTE COMPANY

Consulting and Research Engineers

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ping the previous year by a considerable margin.

Cleveland — Warehouse distributors report sales and shipments during December the lowest of any month this past year. In some instances a decline of 30 per cent from November was reported and one distributor booked less than 40 per cent of the March total, its peak month. Inventory position of most jobbers is still somewhat above normal, although the direct opposite is true among many of their customers. Some improvement in shipments is looked for during January, if the present rate of consumption is maintained. Prices are firm and unchanged.

Chicago—With consumption retarded by the season, warehouse sales during the year end were slow. Some recovery appears probable in January, starting about the middle of the month.

Philadelphia—Warehouse business last week reflected the usual holiday letdown. Business that did come in was confined mostly to lots of a few hundred pounds. Anticipated pickup in industrial activity this month is expected to benefit the jobber trade quickly, especially where rush requirements are involved. Jobber stocks still are substantial.

Cincinnati—Warehouse sales followed the customary year-end pattern, with volume declining as customers took inventory. Throughout the month buyers have held individual orders to bare necessities. Inquiries are fairly numerous and favorable developments may result in considerable tonnage early in the new year.

Seattle — Business continues in small lots, no items being in particular demand. Jobbers anticipate little improvement in next 30 days. No price changes for first quarter have been announced.

EFFICIENT
Pipe and Tube
MILL
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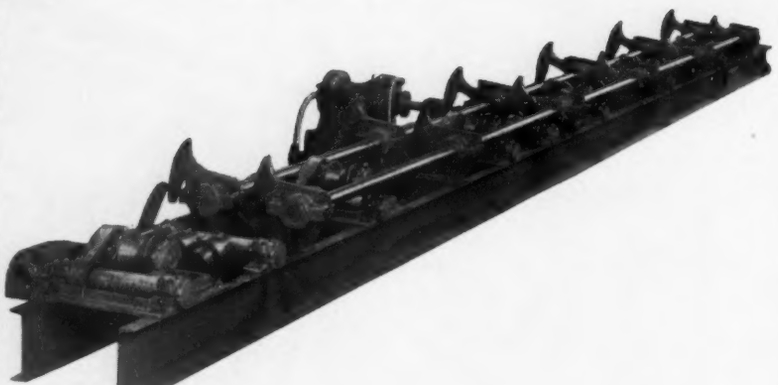

Table for handling pipe to and from threading machines or cutting off machines in an economical manner.

Consult us about your pipe mill problems.

TAYLOR-WILSON MFG. CO.
Main Office Works
500 Thompson Ave. McKees Rocks, Pa.

Tin Plate

Tin Plate Prices, Page 336

Pittsburgh — Important consumers of tin plate are closing routine contracts for next season but as most users have ample stocks and prices are unchanged they are not pressing. Operations are 55 to 60 per cent.

New York—Tin plate specifications should show substantial improvement over the next few weeks, sellers declare. Canning of fish will lead to substantial requirements and export inquiry, which is now somewhat more lively than it has been over the past month or six weeks, should result in better shipments abroad. Foreign buyers until recently have been hesitant because of prices and need of a better appraisal of prospects in other tin plate producing countries. Price, however, appears to be no longer a consideration now that domestic quotations have been reaffirmed and there is less question as to production schedules abroad.

Ferroalloys

Ferroalloy Prices, Page 338

New York—A better movement of ferromanganese in January is being generally anticipated by sellers, as steel ingot production is expected to show some gain. Last month ferromanganese shipments, following the downward trend in steel output, dropped to the lowest rate in 1937 and, in fact, the lowest in at least two or three years, it is claimed. Prices are unchanged at $205.50, duty paid, Atlantic and Gulf ports.

Domestic spiegeleisen, 19 to 21 per cent is holding at $33, Palmerton, Pa., and 26 to 28 per cent, at $39. A pick-up in the movement of spiegeleisen is expected this month also, following a dip last month to the lowest level in many months.

Nonferrous Metals

Nonferrous Metal Prices, Page 338

New York — Seasonal influences tended to keep activity in major nonferrous metal markets at a slow pace last week. Consumers were anxious to keep inventories as low as possible for the inventory-taking period and there were no developments to counteract this situation. The foreign market has failed to furnish an incentive for buying while the weak undertone of the stock market here dampened enthusiasm further.

Copper — Intra-company fabricators continued to give the domestic market its chief support. Custom smelters transacted business at 10.12½c while primary mine producers quoted 11.00c, delivered Connecticut.

Lead — Moderate business was reported in lead for prompt delivery. This indicates that consumption is holding up well and that consumers' stocks are light. Any upturn in general business is expected to be reflected immediately in heavier demand for lead. Prices held at 4.75c, New York, and 4.60c, East St. Louis.

Zinc — The domestic market opened with buying interest no greater than the previous week when total sales amounted to only 456 tons, the lightest reported since the week ended Nov. 27. Prime western zinc sold at 5.00c, East St. Louis.

Tin — Straits spot prices fluctuated widely with prices generally below those prevailing during the previous week. A sharp break in prices in the Eastern market weakened the price structure of both the London and domestic markets.

Antimony — Chinese spot advanced ¾-cent per pound on Tuesday to the nominal quotation of 15.00c, duty paid New York.

Canadian Production Shows Substantial Gain

■ Output of pig iron in Canada for November, at 81,463 tons, was the highest for any month since January, 1930, and compared with 80,922 tons in October, and 74,337 tons in November, 1936. Production included 65,233 tons of basic iron, 5990 tons of foundry, and 10,240 tons of malleable. Production of ferroalloys totaled 6302 tons, compared with 7604 tons in October and 5950 tons in November last year.

Output of steel ingots and castings amounted to 110,688 tons, against 114,527 tons in October and 98,534 tons in November, 1936.

For the 11 months ending with October, as compared with the same months last year, pig iron rose from 610,173 tons to 816,823 tons, ferroalloys from 67,290 tons to 69,442 tons, and steel ingots and castings from 1,010,598 tons to 1,302,677 tons. At the end of November six furnaces were in blast in Canada, with daily capacity of 2525 tons.

40,000 Tons of Rails Awarded in Canada

■ Algoma Steel Corp., Sault Ste. Marie, Ont., has received an order for 40,000 tons of rails from South African railways. The latter have also been inquiring for rolling stock, including locomotive and cars.

Equipment

Seattle—Market is suffering from seasonal dullness but indications are favorable for renewed demand early next year. Electrical equipment is moving in fair volume. Industrial requirements are not heavy as many plants are either down or on curtailed operations due to labor troubles.

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● Test the gauge accuracy of Cold Rolled Precision Strip Steel in carbon or stainless grades. "Mike" the edge of the strip at any point and "mike" the center of the strip wherever that is possible. You will find the gauge remarkably uniform over the entire strip and so far within standard tolerances that there is an appreciable increase in the square feet of area per hundred pounds of metal.

That is the kind of quality that C.M.P. Accuracy provides and it applies to Cold Rolled Precision Strip Steel in all analyses without extra charge. Some manufacturers are enjoying as much as 5% more production per hundred pounds of strip in addition to the higher efficiency that results from using our extra large coils.

Gauges as light as .001" are available in steels of any regular analysis or temper you may require.

The Cold Metal Process Co.
YOUNGSTOWN, OHIO

PRODUCTION

■ HOLIDAY interruptions and irregularities in rolling schedules because of small tonnages on books reduced the national steelworks operating rate 2 points last week to 21 per cent. Indications are that some improvement will develop this month.

Chicago—Declined 1 point to 22½ per cent. While this was the lowest rate of the year, the recession largely was the result of seasonal influences, and schedules of several mills were steady. Fourteen of the district's 39 blast furnaces continue active.

Philadelphia—Up 5 points to 30 per cent. One plant, idle for three weeks, has resumed with three furnaces. Activity at other plants has shown little revision following resumptions subsequent to Christmas week-end.

Pittsburgh—Increased 1 point to 15 per cent. Some producers have increased production slightly and others have gone slightly lower. It appears that the low point was reached the preceding week at 14 per cent and some increase is expected for next week.

New England—Off 9 points to 19 per cent, only one steel works producing ingots. Two or three open hearths are scheduled to resume within the next two weeks.

Wheeling—Unchanged from the preceding week, at 19 per cent.

Youngstown, O.—Down 4 points to 14 per cent, with 19 open hearths operating, seven on part time. This is the lowest rate since 1933. Carnegie-Illinois Steel Corp.'s Ohio works and Youngstown Sheet & Tube Co.'s plant at Campbell, O., are entirely idle.

Cincinnati—Unchanged at 36 per cent with possibility of some increase this week. All production is scheduled for immediate shipment.

Buffalo—Increased 2 points to 16 per cent, one open hearth being relighted.

Cleveland—Off 6 points to 18 per cent, with schedule for this week promising a slight rise.

Birmingham, Ala. — Up 18 points to 63 per cent, three open hearths being added, making 12 in production.

St. Louis—Down 3 points to 12 per cent because of holiday shutdowns. Somewhat better rate is expected to follow in January.

Detroit — Down 19 points to 33 per cent, with 7 open hearths in operation.

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Jan. 1	Change	Same week 1937	Same week 1936
Pittsburgh	15	+ 1	77	38
Chicago	22.5	— 1	77	47
Eastern Pa.	30	+ 5	52	34
Youngstown	14	— 4	78	62
Wheeling	19	None	92	70
Cleveland	18	— 6	77	72
Buffalo	16	+ 2	84	50
Birmingham	63	+18	74	56
New England	19	— 9	75	75
Cincinnati	36	None	92	†
St. Louis	12	— 3	80	†
Detroit	33	—19	100	88
Average	21	— 2	79	49.5

†Not reported.

■ Approximately $30,000,000 has been expended by Continental Can Co. Inc. in the past five years for new plants and plant improvements, a statement by O. C. Hoffman, president, reveals. This was about twice the amount expended in the preceding five years.

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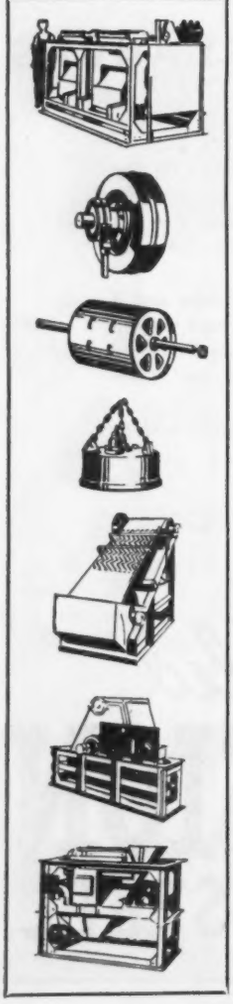

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Drums Brakes
Rolls Special Magnets

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Constant development and research by Stearns engineers, together with extensive laboratory facilities, has been responsible for much of the present day wide-spread utilization of magnetic equipment.

Investigate Stearns products. Consult magnetic headquarters. Avail yourself of Stearns magnetic equipment whether for separation, protection, purification, reclamation, power transmission or special magnetic appliances. You can be sure of receiving high maximum operating efficiency at low costs, an improved product with a definitely profitable investment.

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"The House of Magnetic Magic."

Stearns Magnetic Mfg. Co.
Formerly Magnetic Mfg. Co.
650 S. 28th Street Milwaukee, Wis.

Car Stocks Heavy; Output Slows

■ AUTOMOBILE assemblies last week slowed to the lowest output since 1938 models were introduced. Preliminary estimates indicated total production of 45,000 units, 20,000 each for Ford and General Motors and 5000 for the independent builders. Chrysler was closed.

Belief the automobile business had reached the nadir of the current recession and that prospects for the future are brighter was expressed by W. S. Knudsen, president, General Motors, last week.

Mr. Knudsen announced GM would lay off 30,000 men at the beginning of the new year and that all plants would operate on a 24-hour week, three 8-hour days. The shorter work week was decreed in an effort to spread the work and permit as many as possible to earn a living.

Twenty thousand of those to be dismissed have been working in Michigan plants; 10,000 in other states. The corporation at the moment, he said, has no plans for reducing wage rates. Employes will be furloughed according to seniority.

Asked about factors causing the recession in motordom, Mr. Knudsen said he believed prices increased too rapidly last spring. General Motors' costs increased 13½ per cent; automobile prices went up 8½ per cent. Auto builders had hoped a greater volume would make possible lapping up this difference. Instead production dwindled.

Poor sales during the closing months of 1937 resulted in heavy stocks of finished cars on dealers' floors as the year ended. General Motors inventories, for example, are $65,000,000 more than a year ago, said Mr. Knudsen. The situation is complicated further by a large surplus of used cars, extremely difficult to move during winter months and an impediment to new car sales.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1935	1936	1937
Jan.	300,335	377,244	399,634
Feb.	350,346	300,810	383,698
March	447,894	438,943	519,177
April	477,059	527,625	553,415
May	381,809	480,518	540,357
June	372,085	469,368	521,135
July	345,297	451,206	456,909
Aug.	245,075	275,934	405,064
Sept.	92,728	139,820	175,620
Oct.	280,316	230,049	337,979
Nov.	408,550	405,799	376,637
11 mos.	3,701,494	4,097,316	4,669,629
Dec.	418,317	518,958	.....
Year	4,119,811	4,616,274	.....

Estimated by *Ward's Automotive Reports*

Week ended	
Dec. 4	86,848
Dec. 11	85,765
Dec. 18	82,025
Dec. 25	67,230
Jan. 1	†45,000

	Week ending Jan. 1	Dec. 25
General Motors	†20,000	28,530
Chrysler	.....	10,950
Ford	†20,000	20,615
All others	† 5,000	7,135

†Estimated.

■ An average of more than $254 a year for each employe has been spent by the American Rolling Mill Co. for plant expansion and improvement since 1929.

"Through the depression years and up to date, our company has spent a total of $2291 per employe for plant improvements during the nine years," said Charles R. Hook, president.

For Ball Bearings!

Insures greatest efficiency and long life.
Eliminates pitting and corrosion.
Reduces maintenance cost.

Reason: Lubricates instantly without the aid of frictional heat. Strictly neutral, free of acids or alkalies—keeps dust and moisture out of bearings.

Proof: Approved by most manufacturers of anti-friction bearings and used in thousands of plants—after tests of samples furnished prepaid without charge.

Send for testing sample today-prepaid-NO CHARGE!

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NON-FLUID OIL

MODERN STEEL MILL LUBRICANT

Better Lubrication at Less Cost per Month

MEN OF INDUSTRY

■ WALTER E. HADLEY, general superintendent at the Gary works of Carnegie-Illinois Steel Corp. since February, 1935, has been named manager of operations, Chicago district. He succeeds Walter Mathesius, recently named vice president in charge of operations, United States Steel Corp. of Delaware. Mr. Hadley will be succeeded at Gary by E. E. Moore, who has been general superintendent of Carnegie-Illinois' South works since October, 1935. B. M. Livezey will succeed Mr. Moore as general superintendent of South works. He has been assistant to manager of operations, Chicago district, since February, 1937.

Mr. Hadley began his association with United States Steel Corp. subsidiaries at the McKeesport, Pa., plant of National Tube Co., and in 1909 was transferred to the Ensley, Ala., works of Tennessee Coal, Iron & Railroad Co. as assistant superintendent of blast furnaces. He was appointed assistant general superintendent of Gary works in 1918.

Mr. Moore, identified with Steel corporation subsidiaries since 1919, started in the Gary sheet mill of the former American Sheet & Tin Plate Co. In 1923 he was transferred to the Pittsburgh district, returning to Gary in 1927. In 1932 he was made assistant to general superintendent, South works, and in 1933 was promoted to assistant to vice president.

Walter E. Hadley

Mr. Livezey has been with corporation subsidiaries since 1916, serving in various capacities in the Pittsburgh district. In 1926 he was made superintendent of Carnegie Steel Co.'s by-product coke plant at Clairton, Pa.; in 1936 became assistant general superintendent at Clairton, and in 1937 was transferred to the Chicago district.

E. E. Moore

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J. A. Voelker has been appointed district sales manager for Pittsburgh Steel Co. at New York, with offices at 500 Fifth avenue. Some

Isn't There Always Just

ONE BEST WAY?

• This is a special message about special stampings, and after all, what stampings are NOT special?

Let us start with the assumption that your product is "different"; that it is full of "kinks and gadgets" not found in other products; that your product has changed progressively for the better since you have been making it; or if it is a new product, that it has possibilities for change toward improvement. Assuming these things, along with the fact that we have been responsible so many, many times for the change and improvement in the products of our customers, then why not at least investigate the possibilities of our service?

Your inquiry to us is a strictly "one way" proposition. If we cannot show a better method, a sturdier, simpler design, better engineering, lower cost, or better service, then we know we can't reasonably ask for your business. Your inquiry on this basis entails no obligation. And Schnorr Stampings may mean the difference between profit and loss for you.

C. H. SCHNORR & CO.

643 Railroad St., Springdale, Pa. (*Pittsburgh District*)

years ago he entered the employ of Pittsburgh Steel Products Co., maker of seamless tubing as salesman in the New York office, later being named sales manager there. Since consolidation of that company with Pittsburgh Steel in 1932, Mr. Voelker has had charge of seamless tubing sales in New York office, and for export. His responsibilities now include steel and wire products.

L. A. Mullen will be assistant district sales manager at New York. Prior to his recent association with Pittsburgh Steel, he was with Republic Steel Corp. in sales capacities since 1928. William F. Boore has been named salesman in the New York office. He has been with the company since 1926.

Henry A. Roemer Jr. has been named sales manager of the newly established Pittsburgh district office. Formerly Pittsburgh district

B. M. Livezey

sales were handled by the general office staff. Mr. Roemer has been district sales manager for the company at Charlotte, N. C., since 1936, and previously was with Republic Steel Corp. The Charlotte office has been added to the Pittsburgh office territory.

Associated with Mr. Roemer in the Pittsburgh office is David F. Mann as assistant district sales manager. He has been with the company's sales department since 1913.

♦

Arthur T. Murray has resigned as president, United American Bosch Corp. to become associated with Moore Drop Forging Corp., Springfield, Mass. He will continue as a director and member of the executive committee of the former organization.

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Joseph Highducheck has joined Carboloy Co. Inc., Detroit, manufacturer of carboloy cemented carbide tools, dies and wheel dressers, as service engineer. He formerly was assistant superintendent of the manufacturing equipment department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Highducheck has worked with cemented carbides from the time they were first introduced into this country in 1926, and has had numerous articles published on their use and application. Mr. Highducheck will be located at the Pittsburgh office, but will also cover the Cleveland, Philadelphia and Newark, N. J., territories.

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Constant Bouillon, chief engineer, Hendey Machine Co., Torrington, Conn., received congratulations and testimonials from associates and friends on the recent completion of his half century of employment with the company.

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Edmund S. Davenport, physical metallurgist, research laboratories, United States Steel Corp., Kearny, N. J., has been selected by the American Society for Metals to present the Edward De Mille Campbell memorial lecture at the society's twenty-first annual convention in 1939.

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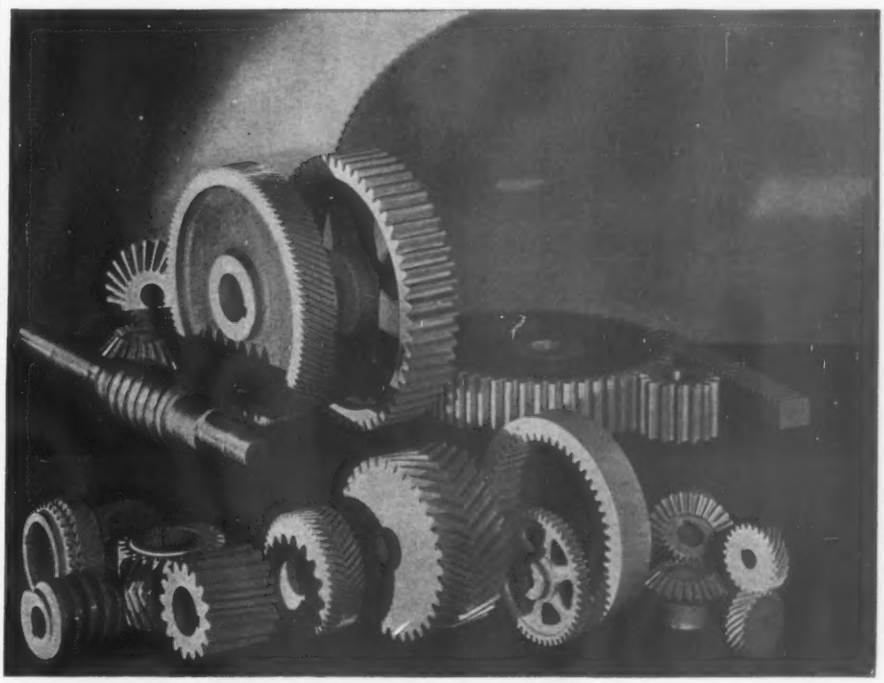

"HARD-DUR" STEEL GEARS
preserve the tooth form . . .

● When gears are in operation, tooth pressure tends to destroy the involute curve and as this wear progresses the gears no longer run efficiently.

Horsburgh & Scott "HARD-DUR" gears not only have involute teeth that are produced to very high standards of accuracy by very careful and painstaking workmanship, but the material is highly wear resistant. In fact, "HARD-DUR" gears possess strength, hardness and wearing qualities so much greater than similar untreated gears that they are guaranteed to have four to five times the life at a cost of only about 50% extra. Their economy is quite apparent.

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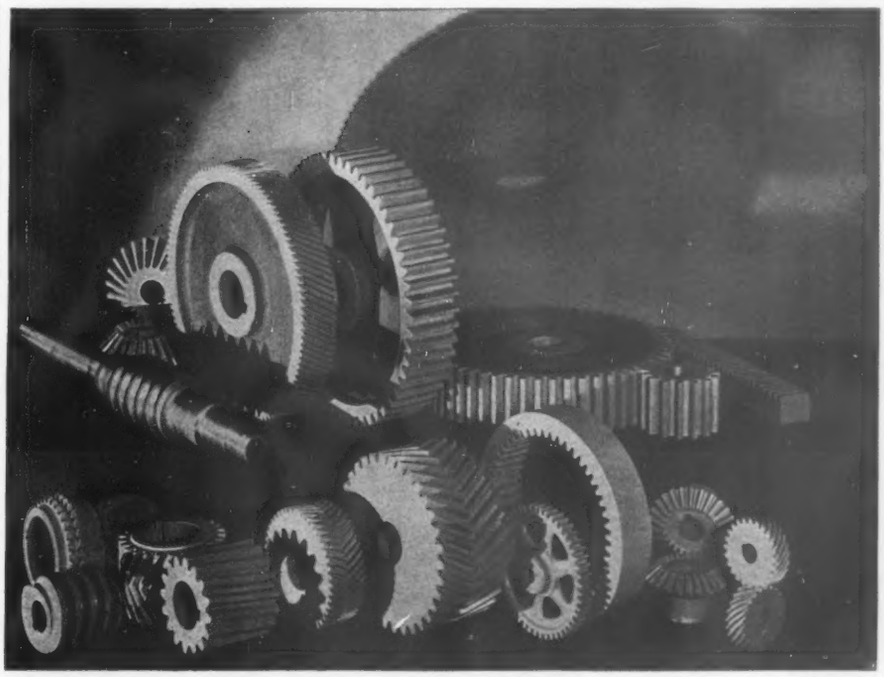

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preserve the tooth form . . .

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of directors of the association are: First vice president, C. C. Wales, assistant general manager, Algoma Steel Corp. Ltd., Sault Ste. Marie, Ont.; second vice president, W. A. Perry, superintendent of electrical and power departments, Inland Steel Co., Indiana Harbor, Ind.; director-at-large, M. J. Conway, fuel engineer, Lukens Steel Co., Coatesville, Pa.; honorary directors, James Farrington, electrical superintendent, Wheeling Steel Corp., Steubenville, O.; E. Friedlander, Pittsburgh, and A. C. Cummins, assistant manager of operations, Pittsburgh district, Carnegie-Illinois Steel Corp.; past presidents, H. G. R. Bennett, assistant general superintendent, Carnegie-Illinois Steel Corp., Duquesne, Pa., and G. R. Carroll, electrical superintendent, Jones & Laughlin Steel Corp., Aliquippa, Pa.; treasurer, F. E. Flynn, general manager, Warren district, Republic Steel Corp., Warren, O.; secretary, J. L. Miller, assistant chief combustion engineer, Republic Steel Corp., Cleveland; directors, C. C. Pecu, lubrication engineer, Bethlehem Steel Co., Lackawanna, N. Y.; C. L. McGranahan, assistant general superintendent, Jones & Laughlin Steel Corp., Pittsburgh; J. A. Clauss, chief engineer, Great Lakes Steel Corp., Ecorse, Mich.; F. E. Leahy, fuel engineer, Youngstown Sheet & Tube Co., Youngstown, O.; E. C. Marshall, chief electrical engineer, Youngstown Sheet & Tube Co., Youngstown; J. F. Headlee, assistant to chief engineer, Carnegie-Illinois Steel Corp., Gary, Ind.; J. E. Harrell, chief electrician, Tennessee Coal, Iron & Railroad Co., Fairfield, Ala.; E. F. Blank, director industrial relations, Jones & Laughlin Steel Corp., Pittsburgh, and A. W. Steed, maintenance superintendent, American Rolling Mill Co., Middletown, O.

Louis F. Coffin

ACID OPEN-HEARTH

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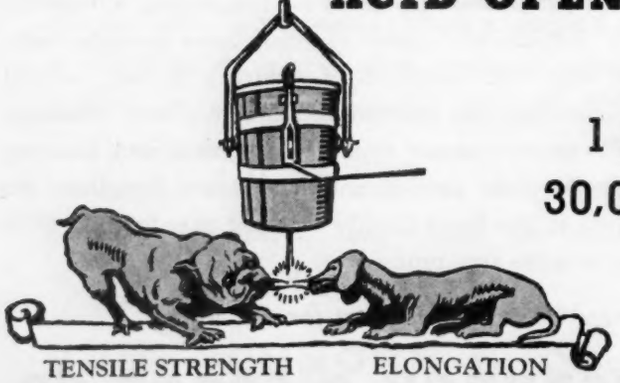
1 lb. to
30,000 lbs.



TENSILE STRENGTH ELONGATION

STRONG STEEL FOUNDRY CO.
BUFFALO, N. Y.

DIED:

■ NEWTON D. BAKER, 66, lawyer, and well known in the steel industry, in Cleveland, Dec. 25. He was successively city solicitor and mayor of Cleveland, secretary of war in President Wilson's cabinet during this country's participation in the World war. He engaged extensively in corporation law practice, and represented iron and steel and related interests in several important cases.

•

Ellis H. Morrell, purchasing agent, National Radiator Corp., Johnstown, Pa., in that city, Dec. 5.

•

James Vehko, 46, for 18 years consulting engineer with Murray Corp. of America, Detroit, and one of the first engineers to specialize in work on all-steel automobile bodies, in Detroit, Dec. 19.

•

Thomas McNeil, 67, retired Pittsburgh industrialist, Dec. 26, on his farm in Butler county, Pennsylvania. In 1889 he entered the boilermaking business operated by his father, known as James McNeil & Bros. Co. Eventually he became president, holding the position until his retirement in 1929.

FINANCIAL

STRIKE, TAX COSTS PREVENT REPUBLIC COMMON DIVIDEND

■ LABOR troubles and repressive legislation, including unsound tax laws, have frustrated earlier hopes that a common stock dividend would be possible in 1937, directors of Republic Steel Corp., Cleveland, informed stockholders last week.

Heavy losses from the strike and a tax burden which has increased "to an alarming extent" have multiplied industry's difficulties, says the directors' letter. It points out steel operations started out at an encouraging rate of 79 per cent, rose to 92 last spring, then started a drop "unprecedented in its degree and rapidity."

"It is becoming increasingly clear that a sound and stable national policy is now imperative if confidence is to be restored.

"The lack of confidence which is so prevalent today has been brought about largely by the thought on the part of some that business and industry could survive under any conditions, no matter how severe they might be. This resulted in restrictive legislation which has handicapped business in a serious way in its attempt to show profits for those who have their money invested.

"The stockholder is also a citizen and as such has a duty. He can urge all his fellows to stand for sound policies . . . "

RUSTLESS PAYS COMMON DIVIDEND IN PREFERRED

■ Rustless Iron & Steel Corp., Baltimore, paid to common stockholders of record Dec. 17 a dividend in shares of $2.50 cumulative convertible preferred stock, second series, without par value, at the rate of one seventy-fifth share of such preferred stock for each share of common. Provisions of this second series preferred stock are substantially identical with those of the 25,000 shares of the first series preferred stock.

The corporation did not pay a dividend in cash since to do so would have necessitated borrowing funds for the purpose. However, if it did not distribute part of its 1937 profits by means of this dividend on the common stock, the corporation would have to pay a tax on its undistributed profits of approximately $141,000.

Pick-up in Pittsburgh Car Loadings Forecast

■ The Allegheny Regional Advisory board in Pittsburgh last week estimated freight car requirements for steel and coal in the first quarter of 1938 will increase over present shipments in that area, but forecast a decline from loadings in first quarter of 1937.

The board predicted the Pittsburgh steel industry will use 20,000 more freight cars than it did in the first quarter of 1936. This estimate suggests the industry in Pittsburgh will operate in the first quarter of 1938 at a higher average rate than the 55 per cent of capacity operations which prevailed in 1936.

The estimated loading for steel in the first quarter of 1938 is 152,082 cars, a decline of 30.3 per cent from 218,195 cars in the same period of 1937. Coal and coke loadings are estimated to decline 18 per cent to 530,478 cars, from 646,924 cars in 1937.

The entire Pittsburgh district will need 809,595 cars, a drop of slightly more than 20 per cent below actual shipments in the first quarter of 1937.

■ Westinghouse Electric & Mfg. Co. distributed approximately $750,000 in Christmas bonuses to 52,000 employes. Payments were computed on basis of $1 for each year of service plus $5.

. . . after Twenty Years it's STILL our story!

F. TINKER & SONS CO. SUCCESSORS TO S. IRE
ROLL TURNERS TOOLS & PLUGS. TOOL STEEL SPECIALTIES.
The Largest Aggregation of Shear Knives on Record!
10 Knives 12,000 lbs.
This aggregation consists of the following: Two, each 215 inches long; Four, each 194 inches long; Two, each 173 inches long. All the above shear knives are 8 1-4" wide and 2 5-8" thick. They are shown ready to be shipped to the largest Rolling Mill in the country for shearing heavy plates. The Other two shear knives are each 152 inches long, 10 1-2 inches wide and 2 3-4" thick, and are for shipment to a prominent steel plant in Japan.
Of course, we make smaller ones, too. Just weighed a pair to-day that were just one pound. Nothing too large that we cannot handle; nothing too small that we will not handle.
Our Solid Steel Shear Knives will cut anything that ANY shear knife will cut. Users are finding them a little better than the other fellows make. There are more years of practical knife making back of ours, which tells the tale.
We also have a Gang Slitter Department for the manufacture of Cutters. They're good, too, and fully guaranteed. Let us eliminate your troubles in this line.
F. Tinker & Sons Co.
(ESTABLISHED 1883)
5687-97 Butler St. PITTSBURGH, PA.
Reprinted from THE IRON TRADE REVIEW, January 4, 1917.

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A record order of shear knives TWENTY YEARS ago. Today that record still stands! And speaking of records, our Shear Knives, Rotary Flying Knives, Continuous Mill Knives, Slitter and Trimmer Knives, Gang Slitting Cutters, Roll Turner's Tools and Plugs, Hardened and Ground Tool Steel Specialties have established enviable records as first quality products. Your inquiry regarding any of these items will be appreciated.

F. TINKER & SONS CO., 5687-97 BUTLER ST. · PITTSBURGH, PA.

Focuses Attention Upon Lesser Known Metals

■ Several metals used as alloying additions in iron, steel and nonferrous metals, and for other industrial applications, drew attention in a symposium on "The Less Familiar Elements" conducted in Cleveland, Dec. 27-29, under auspices of the division of physical and inorganic chemistry, American Chemical society. Approximately 300 chemists participated in the symposium.

Among metallic elements considered were barium, beryllium, cerium, cobalt, columbium, gallium, germanium, indium, iridium, lithium, molybdenum, osmium, palladium, rhenium, rhodium, ruthenium, thallium, titanium, tungsten, uranium. and zirconium. Boron constituted the most prominent nonmetallic. Papers presented dealt with the occurrence, abundance, reduction and commercial uses developed for these elements.

Rare May Become Common

Speaking on the economics of the less familiar elements, particularly beryllium, lithium, titanium and zirconium, H. C. Meyer, president, Foote Mineral Co., Philadelphia, said: "It is not improbable that many of the present well-known metals may within the next half century become outmoded in favor of certain of the relatively more abundant but less known metals of today. Zirconium, for example, is more abundant than nickel, vanadium, or copper."

B. F. Scribner, national bureau of standards, Washington, discussed the occurrence of the less familiar elements in every-day materials, and showed how the spectrograph offers the most convenient means for detecting the majority of these, whereas the chemical analysis method may not be sufficiently accurate.

Notwithstanding the appreciable tonnages of tungsten and molybdenum consumed annually in the alloy steel and chemical industries, these metals in their pure forms are rightly classed as "less familiar" elements, according to Dr. Zay Jeffries and W. P. Sykes, General Electric Co., Cleveland.

"For example," they stated, "the small amount of tungsten used as lamp filaments is sufficient to save people of the United States nearly $3,000,000,000 every year, as compared with expenditures which would be required to produce the same level of illumination with carbon filament lamps."

G. H. McIntyre, director of research, Ferro Enamel Corp., Cleveland, outlined the use of less familiar elements in vitreous enamel frits.

Basic Conditions Sound, Says Gerard Swope

■ "Basic conditions are sound," said Gerard Swope, president, General Electric Co., last week. "The farmers have had bountiful crops, at good prices, and there is plenty of food for all our people. The cotton crop has been good and, although prices are low, with the improvement in methods the profit to the grower is greater. Oil is flowing freely.

"The main disturbance to our economic order is due to lack of confidence . . . If a satisfactory solution is reached and the country is placed on a basis of limiting its expenditures to its income, with the absence of retaliation or reprisal on the part of either business or government, and with a constructive effort and co-operation on the part of both, there is no reason why American business should not resume the function it has played so well in the past, through the mechanization of industry, of making possible the enjoyment of more goods for more people at less cost."

BUDD CAN SAVE YOU MONEY ON PRESSED STEEL PARTS

Because of our wide production facilities for steel stampings, we are in an excellent position to save the manufacturer money on pressed steel parts of all kinds. Our machine shop is the best equipped on the Atlantic seaboard—for both large and small dies. We have helped hundreds of manufacturers lower production costs on blanks and stampings, in both regular-grade and stainless steel. We have quantities of steel in stock, in gauges from No. 5 to No. 22. Let us quote you a price. Send us a blueprint, pencil sketch, or sample of your product, stating the quantity you need. We undoubtedly have the answer to your production problem.

EDW. G. BUDD MANUFACTURING COMPANY
Dept. A
PHILADELPHIA, PENNA.

Manufacturers Answer Jackson

■ A RENEWAL of industry's offer of full co-operation with government to curb unemployment and end the recession was made last week by William B. Warner, president, National Association of Manufacturers, in commenting on a recent address by Robert H. Jackson, assistant attorney general.

Mr. Warner expressed the hope Mr. Jackson's expressed antipathy to business did not represent the government's view toward the manufacturers' desire to help solve economic problems.

Mr. Warner said: "The type of co-operation the country wants is the type that will create conditions under which all business in the country—large and small alike—can prosper and under which the present recession can be stopped and jobs found for the idle. . . . What this country needs is business confidence. Business will move forward, producing more goods, with only the natural hazards of legitimate private enterprise.

"Industry seeks recognition of the simple fact that as factories prosper America prospers and that government can at this time aid large and small manufacturers alike in their efforts to increase employment by removing certain 'road closed' signs."

These Mr. Warner summarized as:

Legislation which reduces incentive to invest funds; continued uncertainty involving federal regulation of industry; policies which hamper the production of more national wealth and income; taxes which are unduly burdensome both in amount and character; continued unbalanced federal budget caused by excessive government spending; legislation which stimulates labor controversies.

Firth-Brown Celebrates "100 Years in Steel"

■ Thos. Firth & John Brown Ltd., Sheffield, England, has issued an attractive brochure, "100 Years in Steel," commemorating the company's centenary. Illustrated in color, the 76-page booklet contains a chronology and brief history of the origin and development of the firm.

First branch was founded in 1837 by Sir John Brown for manufacture and sale of files and springs. Five years later Thomas Firth and two sons, Mark and Thomas, established the Firth branch. The present firm was formed in 1930 by amalgamation of the Thos. Firth & Sons Ltd., and the steel producing interests of John Brown & Co. Ltd.

Independently the Firth and Brown companies played major roles in the development of iron and steel manufacture and its application to railroads, shipbuilding and ordnance as well as to consumer uses. The QUEEN MARY and many other famous ships were built in the Clydebank yards of John Brown & Co. Ltd.

Lord Aberconway is chairman of the present company and Allan J. Grant is managing director.

Early Railroad Buying Proposed as Stimulus

■ Early commitments by railroads for prospective equipment and supplies to stimulate industry generally were proposed last week at a directors' meeting of the Association of American Railroads.

Railroad buying generally has been considered dependent on outcome of the carriers' petition for a further advance in freight rates and an enhanced financial position. Some roads have entered the market with 1938 rail requirements.

Always a LEADER!

IXL
The Mark of Quality

EVERY field is dominated by an outstanding representative—in power transmission equipment it is IXL. Their leadership has developed through a period of 77 years, devoted exclusively to gear manufacturing. That unequalled experience is the basis of IXL quality!

Many leading steel mills have recognized the ruggedness, long-life and dependability of IXL TITAN, Hy-grade and other lines of speed reducers. They know the many other exclusive advantages of IXL products which the paper industry needs. They depend on the extensive knowledge of IXL engineers for proper selection and application to steel mill problems. Do not consider a solution to your problem without investigating IXL advantages.

Send for the IXL handbook "Gear Problems." Free to executives and engineers.

There is a complete IXL Line, of speed reducers, powered gears, special drives and gears of all kinds to fit your requirements.

FOOTE BROS.
GEAR & MACHINE CORPORATION
5311 S. Western Boulevard - Chicago

Activities of Steel Users, Makers

■ GENERAL Electric Co. has been awarded a contract for the propelling machinery for a second turbo-electric, 18,500-ton welded tanker to be built for Atlantic Refining Co., by Sun Shipbuilding & Dry Dock Co., Chester, Pa. The contract includes turbines and the electric drive. Babcock & Wilcox Co. has been awarded the order for the boilers of the new tanker. This order calls for two boilers to operate at a pressure of 625 pounds per square inch and at a steam temperature of 835 degrees, Fahr.

♦

American Steel Products Co., Los Angeles, has moved to new quarters at 1556 Industrial street.

♦

Watson-Stillman Co., Roselle, N. J., maker of hydraulic machinery, has transferred its district sales office from Columbus, O., to Detroit. J. C. Grindlay, western sales manager, will be in charge, with headquarters in the Book building.

♦

Jessop Steel Co. has concluded an arrangement with Forgings & Castings Corp., Ferndale, Mich., whereby the Jessop company's sales force offers complete service on die construction steels. Curved sections of Jessop rolled composite die section steel (water-hardening inserted tool steel) as well as this same grade in bar and cut form may now be obtained. Straight sections and curves of shapes with other grades of insert material also are available. Forgings & Castings Corp. also is prepared to supply Jessop rolled composite die section steel in bar, cut and curved form.

♦

Giant Grip Mfg. Co., Oshkosh, Wis., manufacturer of alternating current welders, truck chain attachments and other forged products, this year commemorates its seventy-fifth anniversary of continuous operation. During the entire 75 years, only two families have operated the plant, the Challoner and Everhart families, the latter the present owners.

—BY THE Hackney METHOD
MILWAUKEE

● *Your requirements* are probably DIFFERENT—but—the Pressed Steel Tank Company has the equipment and experience to meet satisfactorily the requirement for the design and development of many types of special and unusual shapes. Numerous metals (stainless steel, monel metal, nickel, Herculoy, aluminum, brass, bronze, copper, various alloys, etc.) have been used in developing containers in a wide variety of shapes for all types of gases, liquids and solids.

Many companies have turned confidently to Hackney for the most practical solution of their problems involving special shapes in either welded or seamless construction.

Let our engineers work with you. There is no obligation; send blueprints or specifications for practical suggestions.

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1387 Vanderbilt Concourse Bldg., New York, N. Y.
686 Roosevelt Bldg., Los Angeles, Calif.

DEEP DRAWN SHELLS AND SHAPES

W. P. Witherow Predicts "Reasonable Prosperity"

■ "Most important barrier to progress of American business has been the sudden awakening of those who conduct small and large commercial enterprises to the fact that prerogatives of business are being absorbed by the government," declared William P. Witherow, president, Blaw-Knox Co., Pittsburgh, in a year-end statement.

Congress, believes Mr. Witherow, will remove many of the disturbing influences to business at its next session.

"Industry stands ready to eradicate any thoughts of political differences, to co-operate with government in re-establishing, rejuvenating and regenerating the processes of the type and form of government which has made this country great.

"For this reason, and the fact that there is a very great unsatisfied demand for goods and services in all lines of business activity, I look for a period of reasonable prosperity for the year 1938."

World Tin Consumption Gains 13.5 Per Cent in 1937

■ World consumption of tin increased 13.5 per cent during the year ended October, 1937, compared with the corresponding 1936 period, according to the International Tin Research and Development council, New York. Gain of 21,463 tons from 159,065 consumed in 1936 to 180,528 in 1937 was attributed to greater consumption by all principal countries except France.

In the United States consumption

increased 14,652 tons, or 20.5 per cent, from 71,405 to 86,057 tons. Other countries used more tonnage in 1937 as follows: United Kingdom, 24,723 tons, against 21,512, a gain of 14.9 per cent; Russia, 12,200 tons, compared with 9228, an increase of 32.2 per cent; Germany, 11,027 tons, compared with 8357, a gain of 31.9 per cent; and Japan, 8072 tons, compared with 6571 in 1936, an increase of 22.8 per cent. An 8.7 per cent decline in consumption was noted for all other countries, however, from 32,179 tons in 1936 to 29,378 in 1937.

World production of tin plate in the year ended October expanded 14.7 per cent to 4,106,000 tons, from 3,581,000 in the preceding year.

November Steel, Metal Imports, Exports High

■ Exports of iron and steel semi-manufactures in November were valued at $20,288,000, steel mill manufactures at $6,761,000, according to the bureau of foreign and domestic commerce. November imports of iron and steel mill products were valued at $1,684,000, ferroalloys at $1,502,000.

November exports of copper were valued at $6,353,000, refined ingots and bars at $5,383,000. November imports of nickel were valued at $966,000, tin bars, blocks and pigs at $9,184,000.

MEETINGS

ARRANGING PROGRAM FOR WESTERN METAL CONGRESS

■ PLANS are maturing rapidly for the Third Western Metal congress and exposition to be held in the Pan-Pacific auditorium, Los Angeles, March 21-25, under auspices of the American Society for Metals. "Metals in Industry" will be the theme of the congress in which 17 Pacific Coast technical organizations and sections of national technical societies are co-operating.

Under the general theme, sessions are being arranged to deal with the petroleum, mining, chemical, rubber, aircraft, diesel and foundry industries. Also included among topics for the ten technical sessions are: Machinability, grain size, tool steels, stainless steels, corrosion and heat-resisting alloys, flame hardening, controlled atmospheres, and metallurgical standards.

In addition to this program, Pacific Coast sections of the American Welding society will conduct a regional conference devoted to welding. During the same week, the American Society of Mechanical Engineers will hold its spring meeting in Los Angeles.

Organizations participating in the congress include: American Chemical society; American Foundrymen's association; American Institute of Aeronautical Engineers; American Institute of Mining and Metallurgical Engineers, Institute of Metals division; American Petroleum institute, California division; American Society of Civil Engineers; American Society for Mechanical Engineers; American Society for Testing Materials; American Welding society; Chamber of Mines and Oils; Metal Trades and Manufacturers' association; Mining Association of the Southwest; National Association of Purchasing Agents; Pacific Coast Electrical association; Pacific Coast Gas association; Society of Automotive Engineers; and Wire association.

FOUNDRY EQUIPMENT MAKERS WILL MEET IN CLEVELAND

■ Foundry Equipment Manufacturers' association will hold its annual meeting at the Cleveland hotel, Cleveland, Feb. 8. In addition to electing three directors to fill expiring terms, the organization will discuss plans for the coming year and

~~TWENTY-ONE~~ FORTY-SIX
BROSIUS TWO-MOTOR ELECTRIC MECHANICAL CLAY GUNS

have been sold during the past three years, twenty-five of them since January 1, 1937. Twenty-nine were for installation on American furnaces and seventeen for foreign furnaces.

Brosius Electric Guns stop the hole SAFELY and continuously under full wind pressure, producing a more regular operation, a constant gas pressure, and increased production, savings which will pay for the installation in about six months.

No men are required in the danger zone during the plugging operation, a nine cubic foot clay barrel provides ample clay to take care of any emergency, and the hole can be stopped with the iron flowing full.

No clamping mechanism is employed, thus eliminating the delay of clamping the gun before discharging the clay, as with the Brosius gun the clay is discharged the instant the nozzle enters the tapping hole.

Two Hundred Seventy-nine Blast Furnaces throughout the world have been equipped with Brosius Automatic Clay Guns.

OTHER PRODUCTS

Steam and Hydro-Electric Clay Guns, Hand and Motor Operated Goggle Valves, Cinder Notch Stoppers, Flue Dust Conditioners, Blast Furnace Slag Granulating Machines, Soaking Pit Cover Carriages, Single Hook Grab Buckets, Automatic Dump Buckets, Automatic Single Hoist Buckets, Overhead and Auto Floor Charging Machines for serving Heating and Melting Furnaces, Auto Floor Manipulators for serving Steam Hammers, Presses, etc.

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give further consideration to enlarged activities recently inaugurated. One is broadening of its credit interchange work; another deals with completion of plans to develop an industry directory of companies in the foundry business. Existing and pending legislation will be reviewed and steps taken to safeguard and protect the interests of companies in the industry.

GEARMAKERS ANNOUNCE ANNUAL MEETING IN APRIL

■ American Gear Manufacturers association will hold its twenty-second annual meeting at the General Brook hotel, Niagara Falls, Canada, April 18-20. Details will be announced later. J. C. McQuiston, Penn Lincoln hotel, Wilkinsburg, Pa., is secretary-manager.

Convention Calendar

Jan. 10-14—Society of Automotive Engineers. Annual meeting at Book-Cadillac hotel, Detroit. John A. C. Warner, 29 West Thirty-ninth street, New York, is secretary and general manager.

Jan. 12-14—Institute of Scrap Iron and Steel. Tenth annual convention at Ambassador hotel, Atlantic City, N. J. Benjamin Schwartz, 11 West Forty-second street, New York, is director general.

Jan. 13-15—American Engineering council. Annual meeting at Mayflower hotel, Washington. F. M. Feiker, 744 Jackson Place N. W., is executive secretary.

Jan. 17-21—American Road Builders association. Annual convention and exhibit at Public Auditorium, Cleveland. Charles M. Upham, 952 National Press building, Washington, is secretary.

Jan. 23-28—Canning Machinery and Supplies association. Annual convention and exposition at Stevens hotel, Chicago. S. G. Gorsline, Merchandise Mart, Chicago, is secretary.

Jan. 24-26—National Warm Air Heating and Air Conditioning association. Semiannual convention at Roosevelt hotel, New York. A. W. Williams, 50 West Broad street, Columbus, O., is managing director.

Jan. 24-28—American Society of Heating and Ventilating Engineers. Annual convention and exposition at Grand Central Palace, New York. A. V. Hutchinson, 51 Madison avenue, New York, is secretary.

Jan. 24-28—American Institute of Electrical Engineers. Annual winter meeting at Engineering Societies building, New York. H. H. Henline, 33 West Thirty-ninth street, New York, is secretary.

Jan. 25-27—American Society of Refrigerating Engineers. Annual meeting at Roosevelt hotel, New York. D. L. Fiske, 37 West Thirty-ninth street, New York, is secretary.

Feb. 3-4—American Foundrymen's association. Regional meeting at Hotel Schroeder, Milwaukee, under auspices Milwaukee chapter and co-operation of mining and metallurgical school, University of Wisconsin.

Feb. 8—Foundry Equipment Manufacturers' association. Annual meeting at Cleveland hotel, Cleveland. A. J. Tuscany, 632 Penton building, Cleveland, is executive secretary.

Feb. 9-10—Steel Founders' Society of America. Annual meeting at Hotel Cleveland, Cleveland. R. L. Collier, 920 Midland building, Cleveland, is secretary.

March 9—American Society for Testing Materials. Regional meeting at Seneca hotel, Rochester, N. Y., in conjunction with spring group meetings of committees, March 7-11. C. L. Warwick, 260 South Broad street, Philadelphia, is secretary.

March 10-11—Society of Automotive Engineers. National aeronautic meeting at Mayflower hotel, Washington. John A. C. Warner, 29 West Thirty-ninth street, New York, is secretary and general manager.

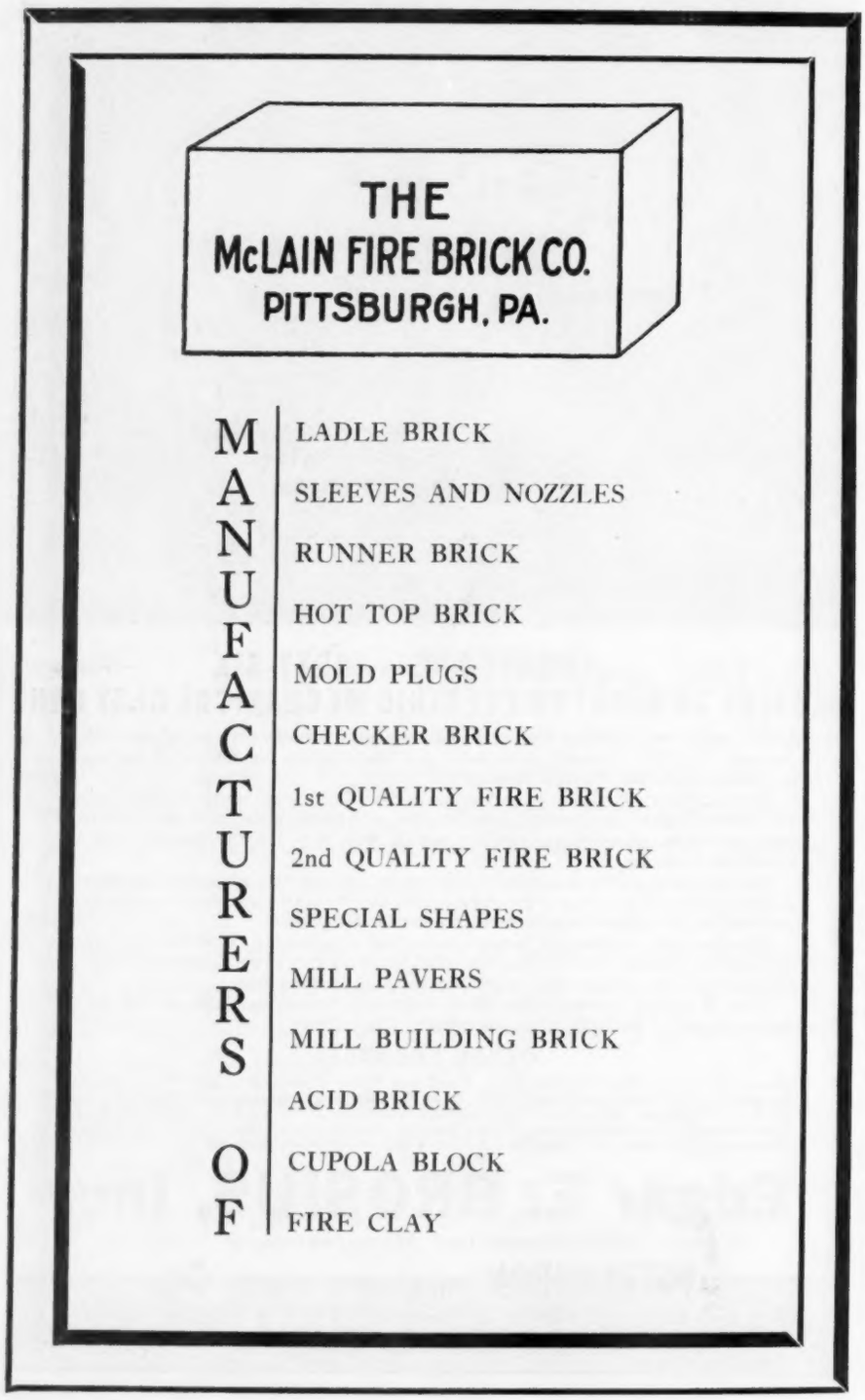
March 14-15 — National Association of Waste Material Dealers. Annual meeting at Hotel Astor, New York. C. M. Haskins, 1109 Times building, New York, is secretary.

March 21-25—American Society for Metals. Third Western Metal congress and exposition at Pan-Pacific auditorium, Los Angeles. W. H. Eisenman, 7016 Euclid avenue, Cleveland, is secretary.

March 21-25—American Welding society. Regional meeting of Pacific Coast sections at Biltmore hotel, Los Angeles.

March 23-25—American Society of Mechanical Engineers. National spring meeting in Los Angeles. C. E. Davies, 29 West Thirty-ninth street, New York, is secretary.

March 27—April 2—American Ceramic society. Annual convention at Roosevelt hotel, New Orleans. Ross C. Purdy, 2525 North High street, Columbus, O., is secretary.



Taylor Explains Industry's Status

■ "AS WE ENTER the new year, it is timely for us to reflect, to recall some of the primary elements which control our physical well-being, that the chief base of our economic structure rests on employment," said Myron C. Taylor, chairman, United States Steel Corp., in a year-end statement.

"Through it raw materials are brought into use, goods are produced or converted, transportation facilities are engaged, distributors come into action, construction flourishes, individuals in all groups have earnings to pay their debts, to spend and to undertake new enterprises. Correspondingly, the need for public and private work or relief declines, the federal, state and city governments have reduced demands, debt increase comes to a halt and ultimately the burden of taxation is lightened while the standard of living rises.

"The recession which set in during the latter part of 1929 was accompanied by employment problems which severely taxed the resourcefulness and fortitude of employers and employes alike. It was early in 1930 that some of us of industry first resorted to the spreading of available work so that the largest practicable number of our workers would have some employment, although at times this was woefully little. Shortly thereafter the municipalities, and subsequently the state and federal governments, took a hand in relieving the situation. It had grown beyond the resources of private agencies to cope with it.

" May Be Depended Upon "

"During the whole period of the depression, industry never slackened its effort to create and expand employment, and though the contrary forces of world and national economics were too great to admit of quick and complete recovery, a slow but steady improvement in volume of business and consequent employment opportunities began in the summer of 1933. From that time, steadily but slowly, to September of this year we saw an uninterrupted advance, climaxed by a rapid acceleration during the first half of 1937.

"The result was that the first nine months of this year witnessed a further substantial revival in all branches of commerce and industry. It proved the most distinct reduction in the unemployment rolls that we had seen since 1929. It was so general throughout the nation that all groups were favorably affected. Industry had an improved income, and more definitely spent, or committed itself to spend, larger sums for replacement of worn or obsolete facilities. In the past three months, however, there has been an abrupt decline of activity to the low point now prevailing. Many industries, including steel, are operating at the lowest point since 1934.

"In the face of such violent fluctuations, it is small wonder that men of all groups are confused and concerned, although it is difficult for most of us to believe that the recession is more than temporary. But the truth remains that the employment base is still the difficult factor in the situation, concerning which men and women have expressed varying views and offered varying remedies, which have been so constantly repeated as to be well-known to all.

"Without attempting to discuss the merits of these plans, of one thing we may be certain: Men of commerce and industry uniformly and without any summons are seeking again to rebuild confidence, restore courage, and relieve distress. They have an abiding affection for their country and may be depended upon to stanchly and without

THIS Ajax Flexible Coupling must stand up under terrific twisting strains... Note the closeness of the bushings... Its manufacturer turned to forgings... and increased the torque capacity by 50%... The small sizes are forged by Hammond & Irving, Inc., Auburn, N. Y., on double frame 1500 lb. Erie Hammers and the big couplings on 6000 lb. Eries... Erie Hammers are well known the world over for forgings of uniform texture and quality. Give your forging requirement the benefit of Erie's 35 years' experience in hammer building and you will be exercising sound judgment ...500 forge shop owners agree that *Erie Builds Dependable Hammers.*

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prejudice uphold our traditional American conception of liberty. For its preservation they will strive as before to set up a renewed rhythm that will give opportunity to work and to live in peace and prosperity to those who inherited, as well as those of foreign birth who now ejoy the benefits of our free institutions.

"Concerted action by the men and women of commerce and industry must and will set in motion the wheels which symbolize work, wages, comfort and happiness. The government was never intended to take their place in the field of progressive individual effort or planning. To shift our burdens to its shoulders, as many would do, would mean the end of individual freedom. Neither should government interfere, deter or discourage us in our efforts to conquer the ills from which we suffer.

"In any case we are comforted in the knowledge that the words retreat or surrender play no part in our mental attitude. They find no place in the American schoolboy's vocabulary and they are not heard in the councils of the nation's real leaders. And though we may dispute various plans of approach to the problem of providing enlarged employment opportunities — the great basis of our American prosperity—we cling, to a man, to faith in America. That was the spirit of the founders—that will be the spirit in which we enter 1938. In such a cause and with such a people there should be no such word as fail!"

The
H. A. MONTGOMERY
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An Organization for your Service

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TRAM-O-LENE ANTI RUST COMPOUNDS
for steel in storage and in transit

ALL TYPES OF METAL
CUTTING COMPOUNDS

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Use of Nickel Up 24 Per Cent

■ WORLD consumption of nickel in all forms during the first ten months of 1937 was approximately 201,000,000 pounds, an increase of 24 per cent over the corresponding period for 1936, according to Robert C. Stanley, chairman and president, the International Nickel Co. of Canada Ltd. In the first ten months of 1929 only 112,000,000 pounds were used.

"Factors which contributed to this increase were the better pace of world business, the larger output of products containing nickel as an established component, introduction of nickel into new products, and the spread of nickel consumption to new industrial countries," said Mr. Stanley.

"Another significant factor has been the rapid development of mass production by manufacturing processes involving highly corrosive conditions, where nickel, high nickel alloys, monel, stainless steel and the various alloy-clad steels provide industry with materials combining requisite strength with the essential resistance to corrosion.

Finding More Outlets

"Only a few years ago caustic soda solution was transported largely in small containers. Then tank cars of nickel-clad steel were designed to carry it in bulk by rail, and now tank ships with holds of the same material have been ordered for its transportation by water. Alcohol and phenol are among the other products now shipped by tank trucks and tank cars of nickel-clad steel to plants equipped with storage vats, piping and processing machinery of which nickel is an important component."

Heavy passenger busses, trucks and trailers depend on nickel alloy steels and nickel cast irons for their ruggedness. Increase in operating speeds and decrease in deadweight haulage of both passenger and freight equipment were factors which turned railroads to nickel steels and other alloys in construction of motive power and rolling stock.

Renewed activity in shipbuilding has been accompanied by a growing interest in nickel alloys in various

marine installations. Spectacular uses of nickel have been made in the new liners.

Agricultural machinery has taken an increasing amount. The chemical industry, expanding into plastics and other synthetic products has and probably will continue to benefit the nickel industry.

New developments in the paper industry and petroleum industry have made these important consumers.

Views Canadian Auto Industry

■ SOLUTION to lower-priced automobiles in Canada lies in increased production, H. J. Carmichael, vice president and general manager, General Motors of Canada Ltd., said in a recent address.

"Today Canada has 18,000 workers in automobile plants and 15,000 in 202 parts manufacturers' plants. General Motors alone employs over 8500. Taking an average of four to a family, there are over 130,000 people whose livelihood depends upon the automobile industry. The wages are recognized as the highest paid to any class of industrial workers in the dominion.

"In 1936 Canada produced 162,167 cars. United States produced 4,454,115, or 28 to Canada's one. United States exported 285,756 or 6.4 per cent, while Canada exported 55,570, or about 34 per cent of total production.

"The most discussed and the most misunderstood question with reference to the motor car in Canada is the differential between American selling prices and those in Canada. The impression is abroad that the Canadian automobile manufacturer is hiding behind the tariff wall and making tremendous profits at the expense of the Canadian motoring public.

"The time is ripe that this thought be removed definitely from the picture inasmuch as it most certainly is not the case.

"General Motors in Canada during the past ten production years produced 596,727 automobiles with a net sales value of $423,879,157 and a percentage of net profit to sales of 2.77 per cent, or less than $20 per car including profit made on service parts and accessory sales. In contrast, General Motors Corp. as a whole, during the same ten years produced 13,947,475 cars with net sales of $10,484,829,442, and percentage of net profit to sales of 15.19 per cent. Or in other words, even including the low net on the Canadian sales, which would tend to pull down the average, the percentage of net profit to sales for the corporation overall was about 5½ times the Canadian average. Possibly the corporation percentage may reflect some small profits from nonautomotive products, but certainly the major portion of General Motors business is automobiles and accessories.

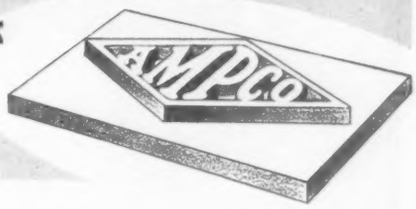
"The figures reveal that General Motors would have been richer by a great many millions of dollars had there been no Canadian production for the past ten years and had the entire production of motor cars for Canada been imported from American plants." Cheaper automobiles in Canada, he said, can come only with greater production, when the mass assembly methods of the United States are applied.

Streamlined Lamps Designed For New Models

■ Among new lamp models announced by the K-D Lamp Co., Cincinnati, are two lamps designed for commercial trucks and a master fog lamp for either trucks or pleasure cars.

Designed to harmonize with the

SEVERAL "POOR RELATIONS"
. . . BUT ONLY ONE
AMPCO METAL
. . . DISTINGUISHED BY THIS MARK



THE luster of iron pyrites deceives us until the testing crucible reveals its true identity as "fools' gold".

Ampco Metal has several "poor relations" in non-ferrous alloys that look like Ampco, but fail dismally when tested for Ampco qualities of wear resistance—tensile strength—corrosion resistance.

There is no patent or secret covering the ingredients in Ampco Metal, but only Ampco Metal, Inc. of Milwaukee, understands the method of combining copper, aluminum and iron to produce the "Ampco Phase" . . . the particular structural formation which provides Ampco Metal with that unmatched wear resistance which has led to its adoption by hundreds of nationally prominent manufacturers.

Genuine Ampco Metal is distinguished by the diamond trade mark reproduced here. It is available only from this Company and its four licensee foundries . . . in six grades of varying hardness and physical properties. The book "Ampco Metal—Its Uses in Modern Industry" will interest you.

AMPCO METAL INC. Dept. S-1-3 Milwaukee, Wis.

AMPCO METAL
"The Metal without an Equal"
BEFORE YOU SPECIFY . . . INVESTIGATE AMPCO

1938 model bodies, the master fog lamp Model 855 is claimed capable of cutting a broad, powerful beam through rain, sleet, snow or fog. The lens is curved, 7 inches in diameter, and of special transmission glass which is said to give maximum visibility, strength, and penetration with a minimum of electricity. The reflector is made of brass and finished in either black and chromium or all chromium. Prefocused bulbs are used. Wiring is silver finished.

Two truck lamps, Models 517 and 518, are designed to conform with the new body lines of commercial trucks. These lamps economize by using only four bulbs instead of the usual 8 bulbs required in the 8-lamp outfit. Model 517 is a streamlined combination marker and clearance lamp for curved surfaces and is fitted with a thick rubber gasket to allow the lamp to fit snugly to the curvature of the body. Model 518 is also a combination market and clearance lamp, but for turtle back surfaces.

World Production

(*Concluded from Page* 290)

tion of Canada—which countries did not quite reach the 1929 mark.

Iron and steel exports and imports of those countries most actively engaged in foreign trade were substantially greater in 1937 than in 1936, especially exports. An advance of about 175 per cent is shown in American exports, and an increase of more than 25 per cent for Belgium. French, German and British exports also gained, and Great Britain increased her imports.

On page 291 will be found detailed comparisons of world production of steel ingots and castings, world output of pig iron, and exports and imports by principal countries. Per capita consumption of steel, shown by the characters in colors, are figured thus: Domestic production, plus imports, minus exports, divided by population.

Leaders in Per Capita Use

On this basis, the United States last year again led with a per capita consumption of 844 pounds, compared with 830 in 1936. Belgium-Luxemburg was next with 746 pounds in 1937, and 602 in 1936. Great Britain and Germany had substantially the same amount of per capita consumption in 1937, both showing approximately 548 pounds. In 1936 Great Britain's consumption was 500 pounds and Germany's 538 pounds.

Per capita use in France rose from 279 pounds in 1936 to 318 pounds in 1937, while Russia showed a gain from 244 pounds in 1936 to 259 pounds in 1937.

Due largely to military requirements Japan's per capita consumption rose sharply, from 158 pounds in 1936 to 298 pounds in 1937, an increase of 88 per cent. Italy's consumption rose to 135 pounds, as against 107 pounds in 1936.

New Steel Gutter Added to Products

■ A new beaded gutter in which the joints slip together and the bead edges snap into place has been announced by Berger manufacturing division, Republic Steel Corp., Canton, O. It appears on the market under the name Snaptite.

The new gutter is designed to save erection time and eliminate close trimming to length because its joints conveniently slip into one another. It can be soldered without tacking and requires no slip joints. Complete forming in one operation with a specially-developed rotary fabricating machine assures rigidity and uniformity, according to Berger engineers.

The Snaptite gutter, latest addition to the Berloy line of steel building products, is produced in rust-resisting Toncan iron, Berloy copper alloy, open hearth steel and 40-pound terne.

SNOWDEN SAMUEL
President

S. A. COCHRAN
Vice Pres.

FRANK SAMUEL & COMPANY, Inc.

Harrison Bldg., Philadelphia, Pa.

●

ALLOYS

Ferro Chrome — Ferro Silicon
Calcium Silicide — Silico Manganese

PIG IRON

Low Phos — English — French

FERRO MANGANESE

Standard — Low Carbon

MANGANESE ORE

Open Hearth Use — Blast Furnace Use

IRON ORES

CHROME ORE

Lump — Ground

●

BRANCH OFFICES
Boston, Mass.—24 Alban Road — New York—40 Exchange Place

Financial

(*Concluded from Page* 198)

even under favorable conditions, could be followed for long, they assert.

For the effect, if practiced regularly, would be to divert the funds thus received into dividends, with needed capital expenditures suffering. Such procedure, they claim, would eventually bring ruin to any company. Sooner or later investors could not be induced to invest in a company thus failing to keep pace with its proper development, nor could banks be expected to make loans. Moreover, the stockholder would eventually be minus his dividends and the employe his wages.

Stated in another way, it is believed advisable to take from the net income such conservative dividends as are not needed in the replenishment of working capital or necessary improvements, and to pay the tax and hope for an early revision in the surtax law.

It is significant that wise management is not borrowing any more than is necessary but rather is converting inventories into cash. Even the inducement of cheap rates is not attractive at present, what with existing uncertainties as to when the company may be able to repay the amount. Parenthetically, cheap money is no longer regarded as a positive business influence, except in the advanced stages of prosperity, when credit is being expanded to the limit of its capacity. Under present conditions, leading financial men hold, business confidence is a prerequisite, for which easy money cannot substitute.

Current Obligations Met First

Incidentally, there was at the close of last year no indication in any quarter of a desire on the part of steel and metalworking companies to postpone improvements or to reduce employment in order to accumulate funds for dividends to avoid payment of the profits tax. Instead, many firms were compelled to postpone improvements in order to meet payrolls and other current obligations and to replenish cash previously used for improvements in expectation of new financing. Such financing was, and still is, virtually out of the question.

Along with sharp criticism of the undistributed profits tax came perhaps less general, but equally strong denunciation of the capital gains tax. Unlike the undistributed profit tax this is not a new device, but has been in effect since the first income tax law of 1913. It treats profits from the sale of security, real estate and other capital as taxable income. But until 1934 business administration losses could be subtracted from taxable income; now these deductions are stringently limited.

This law has been a particular handicap in the raising of new capital because of, if for no other reason, its effect upon the investment banker, who specializes in the raising of money.

Until the law is revised to recognize capital losses, many of these normally important factors in the promotion of funds for needed expansion will mark time, it appears.

In addition to the stringent deductions allowable for administration losses an objection to this tax is that it introduces artificial elements into the markets, tending to freeze investments and thus either to prolong a boom because of hesitation of holders of stock to take taxable profits, or to accentuate a crash.

Indications are that Washington will eventually make revisions. One proposal under consideration provides for a 2- or 3-year carryover of losses: A tax payer who takes a loss of $10,000 in one year but has no capital gain is permitted under the present law to deduct only $2000

"THE MACHINES THAT PUT THE 'RINGS' IN SPRINGS"

No. 1½ Universal Spring Coiler
(SELECTIVE TYPE)
SERIES 650

DURING THE LAST
TWENTY-FIVE YEARS
MORE AUTOMATIC SPRING MAKING-MACHINES HAVE BEEN MADE BY
SLEEPER & HARTLEY INC.
WORCESTER, MASSACHUSETTS
THAN BY ALL OTHER MANUFACTURERS IN
THE WORLD

from his income. The carry-over proposal would permit him to apply the remaining $8000 the following two or three years against expected capital gains.

Sharp decline in industrial securities over recent weeks has revived discussion among company executives of Section 16-A and Section 16-B of the Securities Exchange act. These sections bear particularly on transactions of directors and officers in stocks of their own companies and also of owners of more than 10 per cent of the respective stocks of such companies.

One executive in commenting to STEEL believes that publication of such transactions, as provided under Section 16-A, affords the government and the public in general with sufficient information to prevent improper dealings by directors, officers and principal owners, such as is the avowed purpose of the act.

This being true, there is no reason in his opinion for the application of Section 16-B, which has the effect, he said, of preventing, if not prohibiting, consideration of action along constructive lines by management of, or leading holders of stock in a company. The result is that the securities of a company are subject largely to the caprice of stockholders, whose interest is primarily a trading interest, rather than subject to the influence of those most familiar with the earnings value of the securities.

An officer or a director, he said, might willingly collaborate with management to support the market level of a security in which he is properly interested, but none can afford the risk under what he believes to be the inequitable arrangement provided under Sction 16-B, a section which the observer contends should be eliminated. Section 16-A should prove sufficient to accomplish the end desired by the act, and at the same time, permit initiative and constructive action on the part of those properly interested, in his opinion.

■ THE OBJECTIVES and constructive purposes of good management have throughout the past year been seriously interfered with not only by problems of pertinent financial character, such as taxes, but by continued labor unsettlement such as has been engendered by the Wagner act.

One important steel executive, in commenting on this aspect, says in part:

"Much of this legislation assumes as its basis that the American workmen are of the same caliber and condition as today's Continental European workmen or of the American laborer of 40 years ago, which assumption, of course, is quite false. Instead, while the stated purpose of much of this legislation is the increased happiness of the unthrifty and the unfortunate in our population, the real unstated objective seems to be the regimentation of the lives of all in a pattern of concentrated authority.

Beware of Propagandists

"I feel that the American citizen of both high and low financial status can today well afford to weigh his present blessings under the form of government which has brought them, before listening to or acting on the theories of those 'holier than thou' propagandists whose real motives are fundamentally not concerned with the happiness and ultimate welfare of the population as a whole . . . .

"It all boils down to an accurate concept of proper financial structure, whether it be that of an industrial organization or that of the government of a people.

"I hope there will be no need for the next generation to build a memorial to 'the goose that laid the golden egg.' "

With federal legislation adding

MORTON HIGH DUTY DRAW-CUT

Machine Tools

FOR INDUSTRIAL AND RAILROAD SHOPS

•

STATIONARY KEYWAY CUTTER AND SLOTTING MACHINES
18″ to 72″ stroke—Bulletin 26H

PORTABLE KEYWAY CUTTERS
24″ to 72″ stroke—Bulletin 26H

HIGH DUTY DRAW-CUT SHAPERS
32″ to 60″ stroke—Bulletin 26H

SPECIAL HIGH DUTY DRAW-CUT RAILROAD SHAPERS
38″ to 60″ stroke—Bulletin 25H

This machine will circular slot locomotive driving boxes and can be equipped with Shell Planing, Shoe and Wedge, Rod Brass and Crosshead Attachments, also Turret Type Head, making it the greatest Machine Tool offered for locomotive building and maintenance.

HEAVY DUTY DRAW-CUT FROG AND CROSSING SHAPERS
48″ and 60″ stroke—Bulletin 25H

PORTABLE PLANERS
36″ to 72″ stroke—any length bed
Bulletin 26H

HORIZONTAL BORING, DRILLING, MILLING MACHINE AND DRAW-CUT TRAVELING HEAD PLANERS
48″ to 120″ stroke with horizontal and vertical travel to meet your requirements—Bulletin 26H

ROLL WABBLE SHAPERS
AND TRAVELING HEAD ROLL WABBLE PLANERS—Bulletin 26H

HIGH DUTY DRAW-CUT FLASH TRIMMING MACHINES
6″ to 120″ stroke—Bulletin 26H

CAR JOURNAL BORING, GRINDING AND FINISH MILLING EQUIPMENT—Bulletin 26H

SINGLE AND MULTI-PURPOSE HIGH DUTY DRAW-CUT SHAPERS FOR MACHINING—
Die-Blocks—Plow Shares—Motor Magnet Frames
Chamfering Angle Stiffners—Stoker Discharge Pipes
Beveling High Carbon Mold Boards—Crawler Drive Sprockets
Nips in Color Press Frames—Locomotive Parts
Water Tube Boiler Headers—Pump Vanes—Roll Couplings.

MORTON FINISHED MACHINE KEYS—Bulletin 24H
MORTON HI-PRO KEYS—Bulletin 15H
WOODRUFF KEYS

Bulletins showing Morton Draw-Cut Machine Tools will be gladly forwarded upon request.

Morton Manufacturing Company
Muskegon Heights, Michigan

constantly to the cost of doing business and obviously proving to be the chief handicap to management in its pursuit of sound commercial policies, management probably will intensify further its energies in keeping public opinion informed as to the true measure of its difficulties.

That it has made progress in this direction was demonstrated when congress convened its special session in Washington last November. Returning congressmen were conscious as they had not been in recent years that something should be done for business. True, it took a sharp and generally unexpected slump to drive the point home, and true, also, little yet has happened. But there are evidences of a change in thinking, an advantage that business will undoubtedly care to follow up by keeping its case prominently before the public—and by keeping its own chin up.

Construction

(*Concluded from Page* 203)

volume for H-piles which require little or no fabrication, but aid in the support of structural rolling mill tonnage.

Welding is now permissible under the New York city building code, as well as under Chicago's, but during the current year at least, is not expected to have much influence on the total volume of steel requirements. For attaching column bases, wind braces and secondary parts, welding is increasing and will be extended, but all-welded high buildings are likely to be slow in developing.

While reducing weight, eliminating noise and providing a satisfactory job in all respects, welding is still a higher cost operation for the erection of the average commercial structure. For many special cases, however, welding is highly desirable, for work near hospitals and other instances. Welding has been widely adopted in building construction by Europe, but in most countries abroad, material costs are relatively high and labor costs low. The reverse is true here — materials are comparatively low while labor costs are high.

Fire Law Change Important

A change in the New York building code which is expected to have a far more important influence in the use of steel is included in the provision which makes more elastic the use of materials to cover fire laws. This clause will allow owners of six-story buildings, or those under 100 feet high, to renovate or build up to that height with a variety of materials, notably light steels. There are thousands of such buildings in New York, owners of which may now more economically expand.

As to profits in the structural steel fabricating industry in recent years, the law of supply and demand has not operated. The industry has repeatedly been more prosperous, figured in profit percentages, when demand was light than when tonnage bookings were heavier.

The average f.o.b. cost of fabricated structural steel was estimated at $75.06 a ton in 1936. Last year it was probably higher. The American Institute of Steel Construction found the average sales price in the former year was $76.34 a ton, leaving a profit of $1.26 a ton. The figures for 1937 are not available, but it is generally believed the per ton profit was slightly lower because of higher incidental and shop work labor. Considerable variation continues in sales prices.

Outstanding large projects let last year were 45,000 tons, including 23,000 tons, steel bearing piles, press shop, Ford Motor Co., Detroit, to American Bridge Co. and Carnegie-Illinois Steel Corp.; 30,000 tons, Bronx-Whitestone bridge, New York, several fabricators; 20,000 tons, west side elevated highway, New York; 36,000 tons, Mississippi river bridge,

32 years
1906-1938
Dependable
. . SERVICE
. . QUALITY

DAMASCUS MANGANESE AND ALLOY CASTINGS

Manganese and Alloy Steel Castings One Half to One Thousand Pounds Produced in our modernly equipped foundry from electric furnace steel and heat-treated in automatically controlled gas-fired furnaces.

DAMASCUS STEEL CASTING CO.
New Brighton, Pa.
(Pittsburgh District)

Baton Rouge, La.; 18,230 tons, open hearth building, Great Lakes Steel Co., Detroit; 28,000 tons, electrification, Pennsylvania railroad, Paoli to Harrisburg, Pa.; 55,230 tons, cast iron tunnel rings, Queens Midtown tunnel, New York. Some of the above tonnage includes reinforcing steel and miscellaneous needs.

The total tonnage of reinforcing steel contracts placed last year was below 1936, about 100,000 tons under. Miscellaneous steel entering into construction work was also slightly lower. Prices for reinforcing steel were weak and erratic.

Two important factors are customarily overlooked in most current appraisals of construction industry prospects. Urban population growth in the first half of the current decade was at the rate of 400,000 new persons annually, compared with 1,400,000 per year in the 1920's, according to estimates recently made public by the National Resources committee. Old-fashioned speculative building booms have practically always been stimulated by urban and suburban population growth.

The second factor is that there is at this moment no great expanding industry, like railroads and automobiles in the past. Careful appraisals of the current rises in business and building volume indicates a period of recovery from depression, but not necessarily, as yet, a period of general industrial expansion.

Statistics Show 1937 Decline

Construction statistics, which include structural tonnage, during the first quarter of this year will probably compare unfavorably with those for the same period in 1937. Assuming the current recession to be an interruption of recovery rather than a major recession, it is still difficult to foresee a definite resumption of the recovery movement, but many leaders in the building and economic field now look for such an upward movement about the middle of the year.

"It seems to me that there is a very important lesson in this year's experience," says Thomas S. Holden, vice president in charge of statistics and research, F. W. Dodge Corp. "The construction industry produces new structures for particular marginal groups of people rather than for the whole population. Construction demand, beyond repairs and replacements, comes from new needs, not from needs that occur regularly over short periods. It, therefore, represents a market that is distinctly different from the consumer market. To sell that market effectively without waste of money and effort, requires realistic analysis of its potentialities and use of the most economical and most effective of specialized sales tools."

Mirrors of Motordom

(*Concluded from Page* 225)

American Bantam, built in the refurnished plant of the former Austin car, Butler, Pa. Equipment was installed to permit production of 40,000 of the new midgets yearly.

Ford's Lincoln Zephyr stepped boldly away from tradition in the lines of its 1938 model. With hood of solid steel and radiator grille cut down in size and moved to the lower part of the front end, it is being tipped off by many as the forerunner of a future design in which the grille will disappear entirely and the engine will be moved to the rear.

Briefly, some other noteworthy changes introduced in 1938 models were: Rear coil springs and a new piston shape for Buick; a diaphragm-type clutch of spring steel for Chevrolet; a novel instrument cluster unit for Olds; batteries relocated next to power plants in a dozen cars; Cadillac's new 135-degree V-16 engine, 250 pounds lighter in weight than its predecessor; air ducts under Packard fenders to carry away

warm air from the engine; steel tops for the two smaller Packard lines; transmissions turned on their sides to avoid floor tunnels, by Nash and Studebaker; Evans vacuum gearshifts on Nash, Studebaker and Graham; automatic transmissions on Buick and Olds; forkless gearshifts by Pontiac and Cadillac (all these transmission innovations being optional equipment); longer wheelbases and wider bodies on numerous models; more rubber used in body mountings and spring shackles and other former metal-to-metal joints.

This summary by no means covers all the innovations on 1938 models, but gives some of the important improvements.

The past year was a notable one for the steel industry in the Detroit district. Two major producers, Ford and Great Lakes Steel Corp., embarked upon ambitious programs to enlarge facilities. Great Lakes is erecting a new blast furnace, new coke ovens, four new open hearths, a new slabbing mill, and other incidental equipment to give the plant capacity of 1,400,000 tons of finished steel annually by spring of this year.

Ford's program for steelmaking already has been mentioned briefly. A widened and improved hot strip mill was turned over in December, and rebuilding of two open hearths was nearly completed. Ultimately Ford proposes to duplex open hearth steel in the bessemer converter to save time on heats. Centrifugal casting of alloy steel in the new foundry addition will be an innovation this year.

McClouth Steel Corp. is spending half a million dollars on installation of a cold rolling mill with capacity of 5000 tons per month.

Reports have been current for some months of a new venture in electric melting of alloy steels to be inaugurated in the Detroit district shortly, initial capacity being set at 18,000 tons per month, eventually to be expanded to 50,000 tons.

Windows of Washington

(*Concluded from Page* 216)

the President was asked to comment on it at a recent press conference. Mr. Roosevelt played the whole thing down although he did admit that this money is *NOT* being put aside for future payments by the government but is actually being used now, just as Johnson stated.

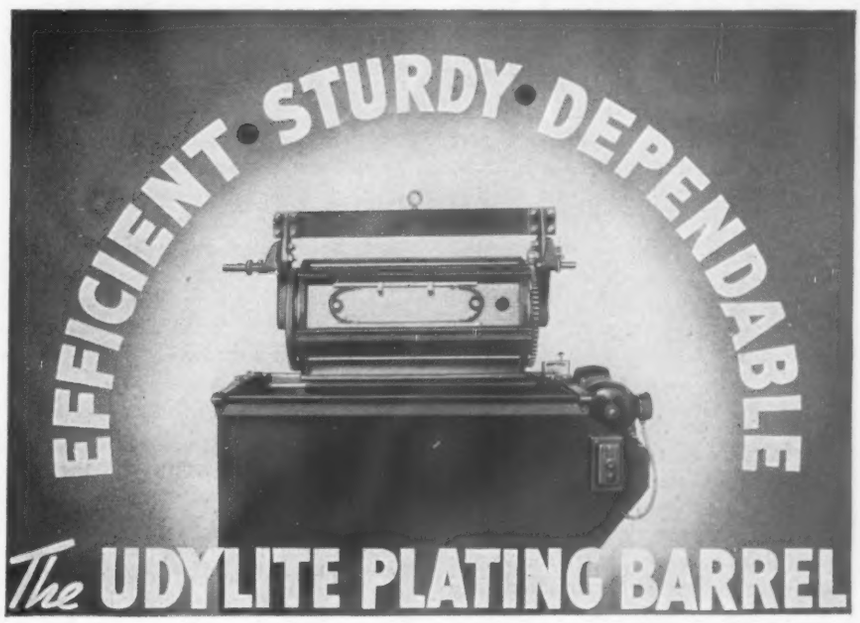
There are always evasive and half-hearted answers to questions of this kind and the President did not convince anyone at the conference that all is well. He pointed out that England had made many changes in its old age pension and employment insurance laws after they were originally passed and he suggested that the same thing would doubtless happen in these United States. There are no pending important amendments to the social security act at present.

The much discussed unemployment census has been taken and according to calculations made sometime ago the government should have at least some preliminary figures to announce in the very near future.

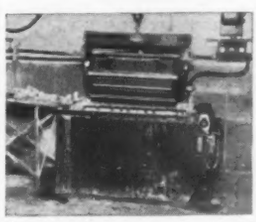
The job was done under the direction of John D. Biggers, prominent glass manufacturer, and if anyone could have made a success of the thing he was the one.

As was pointed out long ago, immediately the census was taken the whole situation might be changed and lo and behold it has been. Unemployment at this moment is apparently increasing so rapidly that no matter how quickly the census is tabulated, it will undoubtedly be obsolete when it is made public.

The question has been asked on many sides, Even if the census should prove a success, what good would it do? Like the old story —



RECORD OF PERFORMANCE



↑ This Udylite barrel has been plating 200 lb. loads, 3 loads per hour, 18 hours per day for 7 months—no repairs.

↓ After 8 months, 24-hour-a-day service in a job plating plant, this Udylite Barrel is still in perfect condition —no maintenance cost.

The Udylite Plating Barrel is efficient! The electrical insulation has been so perfected that all of the current goes directly to the work and "treeing" is eliminated. Steel reinforcing members and cylinder bearings are anodically charged . . . cathode leads are encased in unbroken insulation from bus bar to danglers . . . rubber panels do not absorb plating solution.

For *strength and dependability*, the Udylite Barrel has no equal. The unit is made of the strongest possible combination of materials—steel and special shock-resistant rubber. This results in a plating cylinder of great strength and resistance to rough usage.

On the basis of its remarkable performance, the Udylite Plating Barrel merits investigation. Get full details and prices by writing to the nearest Udylite office.

THE UDYLITE COMPANY

1651 E. Grand Blvd., Detroit, Michigan

New York	Chicago	Cleveland	San Francisco
30 E. 42nd Street	1943 Walnut Street	3756 Carnegie Avenue	114 Sansome Street

Behind the Scenes with STEEL

Annual Addenda

■ OUT HERE in the sticks on page 376 we have a chance to relax and rest up after beating our way through such an array of attractive pages we didn't know where to start and we don't know yet which to go back to first.

Generally speaking, though, we'd like to scatter a bit of credit where it's due. Those seven beautiful inserts in full colors were done in oils by A. L. MacBain of STEEL's art staff, and a beautiful job they are, too. The line drawings heading the various departments are the work of Pat Dwyer Jr. Art Editor Don Cadot hatched the scheme up out of his own head, and still has something left for the regular issues, he claims.

♦

One of the most interesting features of this year's summary is the steelworks expansion tabulation by Jack Knox, beginning on page 278. Among other things he found, when the smoke of the year's construction had cleared away, that three blast furnaces were built, the first new ones since 1928; that three Bessemer converters were built, the first new ones in 14 years; and that more than 256 million dollars in new construction was authorized by 17 steel companies.

♦

Interesting to note is the fact that all production figures throughout the world were available again this year. Last year some figures were unavailable because of censorships imposed.

♦

Hurtling through the scads of attractive advertising pages, we were especially attracted by the Discovery of Phosphorus, pictured by Ohio Ferroalloys Corp. on page 5; by Roebling's golden spread on pages 14 and 15; by the match scratchers supplied by Norton on pages 19, 20, 21, 22; by the crystal ball of Clark Controller on the inside front cover; by the world of markets spread all over page 108 by Petroleum Iron Works; by Industrial Steel Castings on page 38; by—oh, well, by so many others we could harp on them for pages to come yet, but after all, we aren't advertising men and so we'll leave the gaspings and carryings-on up to them for the moment and keddy on with our discussion of the finer things in the book. One of the finest things, aside from this page, of course, is not in the book at all, but in the offices of our circulators, downstairs. It's the sheaf of orders for single copies of the yearbook issue from all parts of the civilized world and most of the uncivilized, too While they last, they'll be sold to all comers indiscriminately for one buck a throw.

♦

Back in the book, we think one of the finest features is the newly enlarged tradename directory of all ferrous and nonferrous alloys, beginning on page 41. This is one of the most complete directories of metals ever published, and it is the work of Erle Ross, engineering editor, who spent hours and hours compiling and checking.

♦

You who are statisticians and are interested in business trends and forecasting, as well as 99 per cent of you who want to keep before you a complete statistical picture of industry will welcome the new chart STEEL's expert statisticians have prepared on page 287. This shows at a glance all figures we have been publishing weekly for some years, and it will bring you *all* of STEEL's charts every week in 1938. The editors think it's one of the most valuable business indicators ever compiled, and we like it, too, because it reminds us of a transcribed lecture in goon language.

—SHRDLU

the operation was a success but the patient died — the only apparent answer is that it will decide some of the bets as to who guessed the right number. It probably will not even form much of a basis on which to write future legislation as conditions are changing overnight in the unemployment situation.

In spite of the fact that more than half a hundred of the leading industrialists of the country belong to the Roper business advisory council, that body cannot look back on much constructive work during 1937 and there is little for it to look forward to in 1938. The reason for the existence of this body is hard to understand and especially in view of the fact that when reports are made to the President by the council no one knows if they ever see the light of day. If they do there is certainly no ballyhoo about it.

Steel Men Council Members

Myron C. Taylor, United States Steel Corp., was a member of the council and had been for some years. Recently he was represented at meetings by Edward R. Stettinius, of the same corporation, who now has succeeded Mr. Taylor as a council member. Industries allied to the steel business are also represented on the council but no effort has been made to have all of the major industries represented.

A by-product of the council has been a series of broadcasts of various industries made by the department of commerce in conjunction with the council. Also during the latter part of 1937 a prominent member of the council added his voice to the program.

Of course, the prime purpose of the organization is to give Secretary of Commerce Roper advice on business matters. This has led, as stated, to the making of reports to the President by the organization. Up to this time, however, most of the reports made to the Chief Executive have apparently been received after he had made up his mind on that particular subject. Little publicity has been given the organization and perhaps that is the reason business men generally believe it to be more or less of a farce.

■ Independent Pneumatic Tool Co., Chicago, manufacturers of portable electric and pneumatic tools, recently announced a bonus to all employes on a basis of 10 per cent of their annual earnings. It was paid Dec. 20. Directors also voted the regular quarterly dividend of 62½ cents a share on the outstanding capital stock of record Dec. 17, paid Dec. 27.

Appliances, Etc.

(*Concluded from Page* 213)

world markets eager for their products in 1937. World rearmament and industrial expansion programs combined to make a demand for approximately 3,450,000 gross tons of iron and steel products, excluding scrap.

Exports, excluding scrap, for the first ten months last year totaled 2,864,063 tons, compared with 958,807 tons in the corresponding period of 1936, an increase of almost 200 per cent. For 12 months in 1936 foreign shipments were 1,102,937 tons, or 3.79 per cent of all steel produced.

Pig iron was the leading product shipped, 719,666 tons in ten months of 1937, against 1936 tons in the comparable 1936 period. Scrap exports soared to 3,520,812 gross tons in the first ten months of 1937, compared with 1,751,046 tons in the same period of 1936.

Total exports, including scrap, were 6,384,875 gross tons in the first ten months, compared with 2,709,853 tons in the corresponding 1936 period. These figures become impressive when compared with 594,650 tons exported in all of 1932 and 1,350,692 tons in 1933.

Japan Best Export Market

Japan was the leading market, taking 721,241 tons, or 28.5 per cent, of all iron and steel shipments, excluding scrap, and 1,806,943 tons of scrap in the first three quarters. Canada was the second largest market for iron and steel products, excluding scrap, and the United Kingdom third. United Kingdom was the second largest scrap market.

Industrial machinery, valued at close to $245,000,000 was exported. Department of commerce statistics for the first ten months show foreign shipments totaled $206,801,869, an increase of 47 per cent over the comparable 1936 trade. Gains were distributed through all classifications.

Iron and steel men and financial experts returning from visits abroad generally agree world markets will continue to offer outlets for substantial tonnages in 1938. Possible barriers to continuation of the heavy export trade are war and the consequent restriction on exports to belligerents.

Power Drives

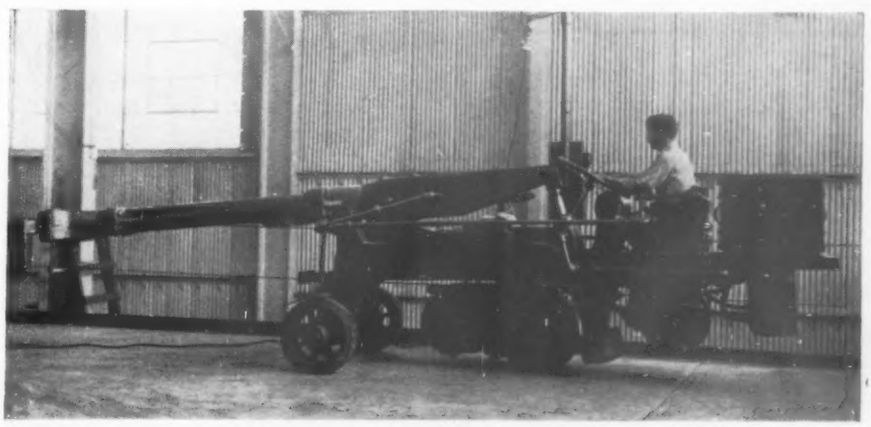
(*Concluded from Page* 246)

improved the products and permitted somewhat higher speeds in operation.

Despite competition from other types of drive equipment flat belts still occupy an important position in power transmission. Leather belt manufacturers have largely overcome the objection to stretch by improved production methods. Similarly rubber belt manufacturers by providing means for vulcanizing belts endless on the drive have overcome the objection to the joint. In some plants preference is given to endless cord belts in connection with pivoted motor drives.

Two of the outstanding features in connection with V-belt drives are the increased use of adjustable diameter sheaves for variable speed and the use of v-belts with pivoted motor bases. Manufacturers of machines are using V-belt drives extensively in connection with shock loads, where absolutely silent drives are essential, and on machines where the drive is likely to be neglected by the user. One comparatively new field of application is the use of v-belts on agricultural machinery, particularly on combines for harvesting. Several thousand machines were so equipped last year for test and present indications are for more extensive installation during the coming season.

The most important trend in



THIRTY-EIGHT

FIFTY-TWO

Brosius Auto Floor Charging Machines

have been supplied to the steel industry in the United States and abroad, fourteen since January 1, 1937. They supply the needs of the smaller plants where expensive charging equipment is not justified.

The Brosius Charger is comparatively inexpensive, self contained, and requires no tracks or runways. It operates in congested areas as it can turn on its own wheel base.

The machine is built for serving open hearths, and similar melting furnaces, for handling slabs, billets, ingots, etc., and for manipulating pieces under hammers and presses.

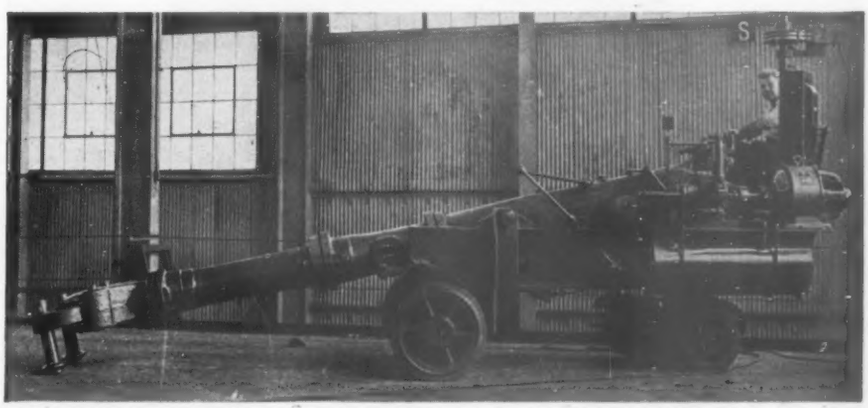
Edgar E. BROSIUS, Inc.

Engineers and Manufacturers

PITTSBURGH SHARPSBURG BRANCH PA.

European Distributor: Dango & Dienenthal, Siegen, Westphalia, Germany

Brosius Equipment is covered by patents allowed and pending in the United States and Foreign Countries



power drives has been the increased use of variable speed transmission. Electrical, mechanical and hydraulic units all have received attention. In some fields the variable speed direct-current motor is replacing multispeed alternating-current units, which at one time replaced them, due largely to improvements in the motors and control.

Control of hydraulic and variable speed units has greatly improved. One development is a control which permits delivery of a fixed constant speed irrespective of variations in the input speed. Higher efficiency and simplicity in control and operation are other factors leading to increased use in industry.

In addition to the improvements in individual elements of power drives, as have been mentioned, careful engineering in their combination or application offer many opportunities for cost reductions. The previously mentioned application of a variable speed transmission unit is only one of the many arrangements possible.

Production executives are still giving careful study to the type of drive to use in the production department. With first or investment cost of greater importance than ever because of the difficulty of obtaining money to make the investment a number of new plants and additions have gone to or retained group drive when individual drive had been considered.

In one case in a Chicago plant the owner of the business had almost insisted on going to individual drive because of appearance. However, when estimates showed an increased first cost of about four to one for the individual drives and not sufficient operating advantages to overcome the higher annual fixed charges he quickly sacrificed his personal preferences and saved several thousand dollars per year in fixed charges and between six and seven times as much in investment.

Group Drives Used

The drives for the new addition, however, were entirely redesigned and modernized into small groups of six to ten machines each to provide greater flexibility of operation. In the former arrangement the machines were driven in three large groups. Ceiling inserts cast in the concrete and standardization on channel stringers simplified the erection and provided for possible future savings, should other changes become necessary in the future. Antifriction lineshaft bearings and relatively close hanger spacing are expected to reduce friction losses and maintenance, thus adding to the savings.

Some of the machines were changed over to individual drive. In one case these machines required motors as large as those used on the group drives. Grouping would not have been economical as during part of the year these all operate three shifts and at other times some are idle. In another case specially designed machines, which operate at relatively high speed, were individualized. These also operate irregularly, due to seasonal production requirements.

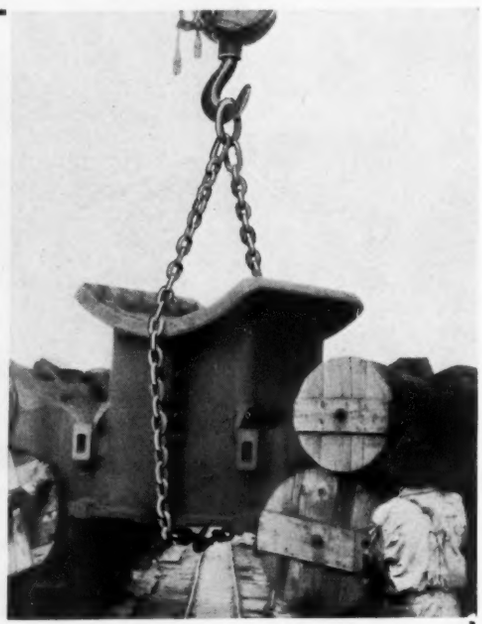
The entire installation was carefully planned for economy in installation where production advantages would not be sacrificed. Appearance was not considered to be of sufficient advantage to be worth the increased cost. An adequate lighting system overcomes the objection to belt shadows and is necessary under any circumstances for the major portion of the operating time and over most of the floor space all of the time.

Other plants investigated have made similar planned changes economically. This reduction in investment and annual fixed charges in overhead expense, combined with reductions in power used and maintenance expense will aid in reducing operating expenses to meet increases in labor or material costs

SAFE!

here's why:

The safe handling of loads by means of CHAIN has always been the primary concern of The McKay Company. For more than 50 years, McKay has been a major factor in the advancement of Chain safety. Read these quick facts about our modern practice:



(1) *Highest Quality Materials.* The iron and steel we use is made to special analyses that we have developed to meet our customers' safety needs. All raw materials received are carefully checked in our laboratories before being used. A tremendous amount of McKay research has been, and is being, conducted for the development of new materials, new qualities.

(2) *Greatest Care in Welding*, with premiums to workmen for quality.

(3) *Most Careful Testing and Inspecting.* Every link must pass the Inspection Department.

(4) "*McKay's 50 Years of Knowing How*," is combined with the most modern facilities and practices in the industry.

THE McKAY COMPANY - - McKay Bldg., Pittsburgh, Pa.

CHAIN *by* McKAY

and so help to maintain a margin for profit in 1938.

Other plants contemplating changes or rearrangement can profit in the same manner. Each installation presents an individual problem in selection of size and arrangement of groups and in determining which machines to group and which to individualize. Most engineers have found that planned grouping with certain machines individually driven is more economical and advantageous than either 100 per cent group or 100 per cent individually driven.

Materials Handling

(*Concluded from Page* 243)

cranes.

Cleveland Tramrail Division, Wickliffe, Ohio, designed a governor-operated, hand-propelled carrier, which permits the speed of this type of carrier to be predetermined and regulated in traveling down-grade.

Shaw-Box Crane & Hoist Co., Muskegon, Mich., introduced two new small electric hoists of the low head room type, one for 350 pounds and one for 700 pounds.

Lewis-Shepard Co., Watertown, Mass., introduced several special lift-trucks, notably a hydraulic unit designed for handling tin plate.

Lyon Iron Works, Greene, N. Y., designed a hydraulic lift-truck with a platform featuring a 10-inch lift.

Revolvator Co., North Bergen, N. J., added to its line a two-level freight elevator; a beam truck; a low-platform stacker; and a new hydraulic all-purpose lift truck.

Industrial Brownhoist Corp., Cleveland, announced a heavy-duty crane with capacity of 50 tons with outriggers in place. Features are a two-speed hoist mechanism, four travel speeds with top speed of 15 miles per hour and means of disengaging crab when crane is traveling, oil type cases enclosing travel gears under the car and helical worm gear drive mounted on antifriction bearings and running in oil bath.

Bucyrus-Erie Co., So. Milwaukee, introduced an innovation in equipping a crawler crane cab with a skylight for better vision for the operator.

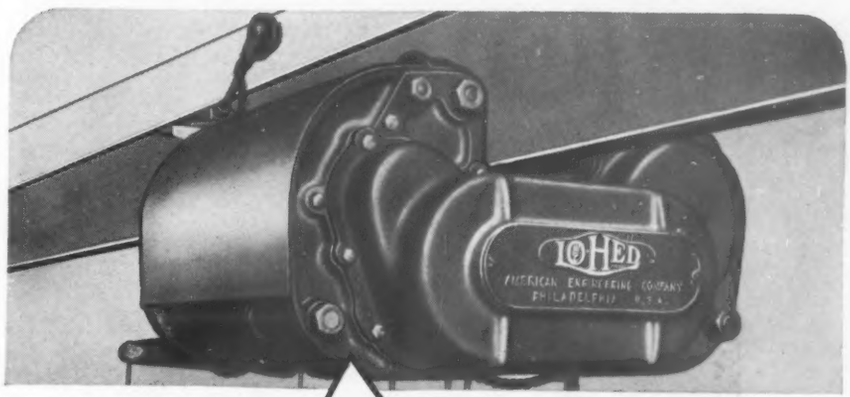
Northwest Engineering Co., Chicago, equipped a new line of small shovels with a device called the cushion clutch to reduce stresses on all parts under power when the hoist rope is tensioned. It also introduced a new ⅝-yard convertible shovel.

In the list of accessories, the past year witnessed the first appearance of several new sheet metal grabs and grips. One, manufactured by Richards-Wilcox Mfg. Co., Aurora, Ill., is of two and three ton capacities for handling sheets from 24 to 40 inches in width and has a grab action similar to that of a pair of scissors. Cullen-Friestedt Co., Chicago, developed mechanical lifters with capacities up to 60 tons. Smith Devices, Philadelphia, placed on the market three new grips, one for holding heavy pieces of steel, a second for light forging handling and the third for automatic release of crane loads.

While the foregoing is in no sense a complete list of the countless accomplishments in materials handling during the year 1937, it is indicative of what the industry has been doing.

Use Steel Partitions

Bradley Washfountain Co., Milwaukee, has announced that Multi-Stall showers, both circular "5-in-a-group" and semi-circular "3-in-a-group" models are now available with stainless steel partitions. The partitions are constructed of 16-gage stainless steel stock with a tubular beading of the same material. Chromium plated brass fittings and aluminum enamel lend an esthetic value.



A High Factor of Safety Here

Assures Safer Handling Here

Specify *THE* hoist with the highest factor of safety!

Let the nearest A-E-CO representative show you why A-E-CO Lo-Hed HOISTS are the safest hoists built.

Ask him to explain Lo-Hed's exclusive features that mean constant, dependable performance and lower maintenance cost.

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Find out *why* Lo-Hed is the logical hoist for EVERY purpose and why it is the *only* hoist for low headroom conditions. A-E-CO Lo-Hed HOISTS are built in 98 standard models—from ¼ to 12 ton capacities.

Classified phone directories list the local A-E-CO representative in principal cities. Call him in... or write us for the new hoist catalog.

A-E-CO Lo-Hed HOIST

AMERICAN ENGINEERING COMPANY

2484 ARAMINGO AVENUE, - PHILADELPHIA, PA.

Welding

(*Concluded from Page* 252)

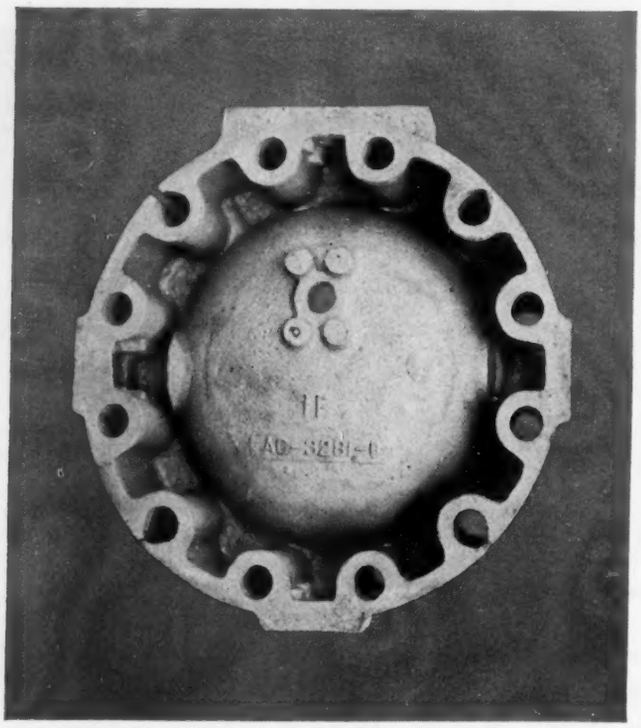
rivet before the head starts to be deformed."

The high button head rivet, however, is only one of the many rivets standardized in 1937 according to W. C. Stewart, technical advisor, American Institute of Bolt, Nut and Rivet Manufacturers, Cleveland. He says, "Progress in riveting resulted in the adoption of the American standard large rivets in 1937, following 11 years of intensive study and research by a representative committee of the American standards association. This important development establishes standard types and uniform dimensions of manufactured heads, both before and after driving, driven heads and rivet set impressions. Previously there existed many forms of rivets with numerous diversifications from each form, seemingly representing the whims of many people. Principal manufacturers and consumers of rivets were consulted and rivets studied to determine forms most suitable for specific fields of application and to eliminate unnecessary varieties. The new standards have been generally distributed and found satisfactory. Their establishment with consequent simplification of varieties and improvement in design will result in economy of manufacture and distribution as well as improvement in service to users."

Fabrication of high pressure, high temperature, steam pipe lines is one of the important developments in the use of welding, according to E. R. Fish, chief engineer, Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn. He points out: "Where pressures on the order of 1400 pounds per square inch and temperatures up to 950 degrees Fahr. are used, it is evident that special materials are required to give safe service. Steam lines of this kind, after having once been placed in operation, are rarely if ever taken out of service. Fabrication of such lines by welding is by far the preferred method of construction and is now generally accepted.

"Welding the special material required necessitates positive determination of the proper welding procedure in order to assure welds with the required physical characteristics. With proper procedure determined, it is absolutely necessary that welding operators demonstrate their ability to produce sound welds under such procedure. This is important in obtaining welds that will continue to be safe for an indefinite length of time.

"Metallurgists are continually at work developing new materials to meet unusual applications. Each new material needs to have its weldability and proper welding procedure determined. In using new materials, care must be taken to guard against the inclination to assume that, because a certain procedure produced successful results with a similar material, such procedure will produce good welds with the new material."



Electric Cast Steel

CYLINDER HEAD

A casting in which molding, core making and furnace technique must be combined to a high degree of perfection to obtain satisfactory results.

CYLINDER HEADS are extensively machined and the slightest imperfection would be sufficient cause for rejection—

FORT PITT STEEL CASTING COMPANY—Specialists in casting accurate, intricate steel castings.

ONE LARGE AND ONE SMALL ELECTRIC FURNACE MAKE POSSIBLE PROMPT DELIVERIES UNDER ALL CIRCUMSTANCES.

FORT PITT STEEL CASTING COMPANY

McKEESPORT, PA.

Forging and Stamping

(*Concluded from Page* 234)

ing an arrangement for the control of atmospheres similar to that on current use in heat treating furnaces, but designed so as to maintain a desired condition without loss of production heating requirements."

Nearly ten million pounds of steel forgings and castings went into drop hammers built by Erie Foundry Co., Erie, Pa., according to Macdonald S. Reed, sales manager. The most significant fact in this statement is that average weight of the hammers jumped from between 3000 to 4000 pounds to 7700 pounds. Largest hammer constructed to the present is a 35,000 pound model; however, there is now under construction for export a 50,000-pound hammer. These large models are, of course, steam drop hammers; there has

been no unusually large board hammer built, according to Mr. Reed. In this field, most significant has been application of V-belt drives.

Steel makers have been responsible directly for a majority of the advances made in stampings. From every stamping manufacturer comes a good word for the aid given him in licking the problems of deep drawing, scrap reduction and the like which result from increasingly difficult demands from users of stampings. Significant of manufacturing economies is the steady price of pressed metal products in the face of mounting labor and material costs.

According to George Spatta, vice president and general manager, Clark Equipment Co., Buchanan, Mich., metallurgists of all steel companies are to be complimented on the fine job they have performed in finding the proper steel specifications to lick the stamping problems in their customers' plants.

Measures Coil Stock

In the field of stamping equipment, one of the year's important developments, in the eyes of R. B. Treer, chief engineer, Cleveland Punch & Shear Works Co., Cleveland, is the accurate measuring of coil stock by means of roll feeds which are synchronized with the press. These automatic feeds, which are capable of handling the largest rolls of coiled stock, measure the material to an extreme accuracy and feed it to the press or squaring shear if desired.

Other advances pointed out by Mr. Treer include improvement of accessories for draw cushions and relocation of the driving mechanism as well as enclosing it in oil tight housings. A pertinent thought for the future, says Mr. Treer, is a system whereby stamping equipment in various plants of any company could be co-ordinated in order to enable the management to shift production from one point to another at will, without disrupting the management of either plant. The basic reason this cannot be done easily in most cases, he states, is that each plant operates as a unit and new equipment is purchased with only the immediate plant needs in view instead of the production needs of the entire company.

Accelerated use of the better grades of recently developed steels in making dies with longer life, greater ease of die setting and capable of producing a greater number of finished stampings is the most important of the year's developments, in the opinion of H. H. Burt, plant engineer, General Fireproofing Co., Youngstown, O. Mr. Burt also points out as significant the trend towards a breakdown of centralized press rooms, noting a tendency to place the presses directly in the production lines they feed. This is a result of general cognizance of the fact that materials handling costs, an important factor on costs, may be greatly reduced through this setup.

From the angle of steel production, continued progress has been made in the past year in improving the drawing quality of high grade sheets from the wide continuous strip-sheet mills, according to F. D. Poto, Inland Steel Co., Chicago. Appreciation of the effects of grain structure and surface conditions became manifest during 1937, and more strenuous efforts at control along these lines are being made constantly. In addition, Mr. Poto said, there has been a more concentrated effort to make and process the steel to suit individual needs, both as to the particular job and the sheet user's particular setup and practice. This effort, starting at the blast furnace, carries through the open hearth and the continuous hot and cold mills. In the latter more definite annealing temperatures and time ranges have been established to meet specific needs.

Auto body designers have begun

Welded
BOX GIRDER
CRANES

SHEPARD NILES
also manufactures
- Transfer Cranes
- Grab Bucket Cranes
- Gantry Cranes
- Ice Plant Cranes
- Single I-Beam Cranes
- Jib and Bracket Cranes

● In this type of crane the rugged box section girder is formed by welding together the flanges of two wide flange I-Beams which are diaphragmed at regular intervals through their entire length.

Capacities—Welded Girder—1 to 15 tons.
Riveted Girder—up to 450 tons.

Standard Shepard Niles Crane Trolleys with their balanced drive gearing, oil bath lubrication, compact design, interchangeable unit construction are available for welded box girder cranes.

A COMPLETE LINE OF CRANES & HOISTS

SHEPARD NILES CRANE & HOIST CORP.

358 Schuyler Avenue . . . MONTOUR FALLS, N. Y.

to recognize the drawing limits of steels, Mr. Pope claims, and have attempted to eliminate the bottlenecks caused by stampings difficult to produce without excessive scrap loss. In

Lighter Gages Used

In opposition to this trend, many producers are asking for lighter gage sheets in difficult stampings. While this has made it more difficult for the sheet maker, it has also started further improvement by demanding greater refinement along the lines taken. It is believed an important factor in future improvement will be better carbide dispersion, resulting in a better balance between softness, ductility and tenacity.

One great need in the field of stampings, as expressed by many makers and users, is proper specification of tolerances. Expressed in STEEL for Oct. 11 by L. M. Worth, Graham-Paige Motors Corp., Detroit, this need has been re-echoed by many others in the stamping industry. "When the stamper finally gets these problems worked out with his customer before the order is placed, he will be on the road to getting proper returns . . .," says M. L. Fox, chief engineer, Parish Pressed Steel Co., Reading, Pa.

Quality Cokes ★ Tin Plates *of Character*

Annual Capacity 600,000 Base Boxes

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Main Office and Works: WASHINGTON, PENNA.

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Machining

(*Concluded from Page* 266)

the power operated bar chuck and bar feed constitute the three important advances in our line of manufacture during 1937.

"The pre-selector," he adds, "substitutes one lever for four, enables the operator to select proper speed in advance for the next cut and then obtain that speed instantly by flipping a single lever. The power driven chuck wrench, bar chuck and bar feed add to the operator's efficiency by eliminating fatigue from manual operation.

"The continued trend toward higher speed has required better wearing surfaces and more protection for these surfaces. Chips, now cut at terrific speeds, get into crevices never reached before so improved protection, new guards and greater general wear proofing are necessary."

Increased machine tool electrification is emphasized by J. W. Harper, Industrial Department, General Electric Co., Schenectady, who says, "For several years there has been a decided trend toward individual electrification of the various machine functions. With added motors, increased control is required for the proper sequencing of operations. A result is control for machine tools has become of more importance because of the larger part it plays in the successful operation of the machine. Also more control devices have been made available for machine tools. Push buttons with indicating lamps built into the button itself; push buttons with individual single hole mounting, but which are oil tight; selector switches of the same type; oil tight limit switches; small devices for building into machine tools; wire with oil and acid resisting insulation—all these and others are a direct result of increased machine tool electrification.

"While considerable thought," he adds, "has already been given to electrical control for machines, there is still a large field to be covered. Since successful operation of elaborate machine tools is largely dependent upon proper functioning of electrical equipment, it becomes necessary to give this equipment every consideration." In conclusion, Mr. Harper states, "We can therefore expect additional progress in the future toward controls which will make the machine tool more and more productive."

In commenting upon the introduction of permanent magnet chucks into the United States, J. S. Chafee of Brown & Sharpe Mfg. Co., Providence, R. I., says, "These chucks, using permanent magnets of aluminum-nickel-cobalt alloy, do away with the necessity for wiring, switches and a direct current power

supply. They are now being manufactured in this country for the first time.

"The continued and increased use of stainless steel in machinist's tools is also noteworthy," adds Mr. Chafee.

Taking a look at 1937, H. J. Griffing, sales research engineer, Norton Co., Worcester, Mass., reminds us, "Although the age of acorn adorned machine tools is now past, there are still a lot of out-of-date machine tools in use which are eating up profits. Their owners look upon them as an investment they do not wish to discard. Competent authorities have set ten years as the period of usefulness for most machine tools. Even if extended to 15 years, the majority of machine tools in use today would be past their period of usefulness. The problem of whether to purchase a single or general purpose machine is largely eliminated today by the interchangeable elements available with standard machines which in effect make them single purpose machines.

Modernization Needed

"Modernization is something similar to development," adds Mr. Griffing, "It is never really completed. Perhaps the greatest field for modernization today is in our own government's arsenals, navy yards and airports. Although some steps have been taken in this direction, we are still far behind other nations."

In the metal cutting field, standard shapes of cemented carbide blanks and tips were announced on June 8, 1937. Based upon experience with thousands of carbide applications, three styles in 150 sizes were found to be adaptable to more than 90 per cent of all Carboloy tools in use. In pointing out the benefits of this standardization, E. C. Howell, advertising manager, Carboloy Co., Detroit, says, "Because quantity production methods are now possible in the manufacture of these standard tips, the user has been given the opportunity to participate in the resultant savings through a special scale of discounts. Nor do the savings stop at the reduction in investment cost. The user is also able to economize because these standard tips greatly simplify stock problems, reduce tool designing time and are easier to order. Eighteen standard single point tools employing these tips were also made available.

"In the grinding field, the favorable effects of standardization were also felt during 1937 since in June the number of diamond-impregnated Carboloy wheel dressers necessary to do more than 60 per cent of all common dressing operations was reduced from nine to three sizes, accompanied by lower dresser costs.

"Cemented carbides experienced little development as far as new grades were concerned although constructive investigations were made in correct tool design and application employing existing grades. From our findings we feel we have made very definite progress in steel cutting tool designs and application methods," according to Mr. Howell's observations.

Another of the newer alloys is a cobalt-chromium-tungsten substance which is claimed makes possible a 10 to 50 per cent increase in speeds and feeds above those previously employed with high speed alloys. This new alloy is available in the form of all usual cutting tools, as milling cutters and small tools to fit various other requirements.

Rapidly coming into wider use are numerous alloys applied to cutting tools by welding. Supplied in the form of welding or brazing rod or paste, the electric arc or oxy-acetylene flame is used to place them on the cutting edge.

High pressure die castings machines have undergone much improvement during 1937, according to F. W. McIntyre, vice president and general manager of Reed Prentice Corp., Worcester, Mass. He states, "High pressure plunger type die

"NO SURFACE MACHINING NECESSARY on this WYCKOFF BAR STOCK— Bill"
"And what's more Bill, Wyckoff threads and cuts faster... permits higher spindle speeds... requires fewer tool grinds. Give me Wyckoff every time for real automatic screw machine production—it's got what it takes—and how!"
WYCKOFF DRAWN STEEL COMPANY
General Offices: FIRST NATIONAL BANK BUILDING, PITTSBURGH, PA.
Mills at AMBRIDGE, PA. and CHICAGO, ILL.
Manufacturers of... Carbon and Alloy Steels... Turned and Polished Shafting... Turned and Ground Shafting... Wide Flats up to 12"x2". Warehouse stocks carried by nationally known distributors

casting machines for producing aluminum alloy die castings are on their way to successful operation in many of the leading plants in this country. Air operated machines forcing metal into the dies under 450 to 550 pounds per square inch pressure are obsolete today, in our opinion. In new machines, molten metal is ladled into a cylinder and forced into the dies under 5000 to 15,000 pounds per square inch pressure giving a dense homogeneous casting with an excellent finish and high strength. This method also eliminates pickup of foreign matter.

"Another improvement," continues Mr. McIntyre, "is a high pressure die casting machine that successfully produces brass die castings. This process is making savings amounting to over 40 per cent compared to the old method of sand casting, machining and finishing for a plumbing supply manufacturer who is now making 57 parts with it. Injection moulding of cellulose acetate material is another development making rapid progress."

C. N. Kirkpatrick, secretary and sales manager, Landis Machine Co., Waynesboro, Pa., comments upon the insistence of machine tool buyers that operating fatigue be reduced to an absolute minimum. He says, "We have had during the past year a number of demands for hydraulically operated machines merely from the standpoint that the operator would be less fatigued. This creditable consideration on the part of the buyer has undoubtedly assisted in maintaining a higher operating efficiency in turn resulting a production costs which are definitely lowered.

Need Greater Accuracy

"The demand for accuracy continues to grow partly due to greater accuracy being obtained without any sacrifice in production or increase in costs," he adds.

In common with many other executives, August H. Tuechter, president of The Cincinnati Bickford Tool Co., Cincinnati, emphasizes that future machine tool development hinges on governmental attitude towards business. He says, "Just what further advances can and will be made in the year of 1938 and in the years beyond will depend very much, for the first time in our history, on the attitude of our Federal Government toward industry. It does seem that the builders of machine tools who have produced so much of our national wealth and have contributed so much to the well being of the people of the world should be due for proper consideration and encouragement by those who are elected to have authority over us. In other words, business has been harassed by unjust taxation and laws not constructive to a point where industry must and is pleading for relief in order to again go forward as it should."

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GROOV-PINS are found in so many applications today because they are positive locking, less expensive to use and because they reduce the manufacturing operations in production.
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More than a billion already in use in all kinds of machinery, automobiles, materials handling equipment, power transmission equipment, and for positively affixing all kinds of parts, proves their success in actual use.
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Fifty-seven illustrations and numerous tables will help you solve many of your expensive operations by substituting GROOV-PINS for your present methods. Engineering data and complete information given in this booklet will show how you can save time and money while assuring a better grip.
Send for your copy of the GROOV-PIN Bulletin today—no obligation of course.
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Heat Treating

(*Concluded from Page* 231)

rectangular cross section and sufficient length to handle these rods. The unit consists of a steel shell within which inside and outside refractory linings were rammed. A steel pot was tried originally, but because of some difficulties, including that of obtaining a shell formed from only one piece of metal, it was decided to abandon this idea.

Explaining operation of the equipment, Mr. Croft states that after bringing it up to temperature gradually by extraneous heating over an extended period to avoid cracking the refractory, the electrodes and salt were introduced. The bath is heated by six pairs of electrodes at one side of the bath so spaced as to maintain the maximum amount of heating and agitation of bath. The latter is covered with a layer of comparatively inert material which reduces radiation losses and vaporization of the salt and enables

the operator to work in the vicinity of the unit in comfort.

The salt is so compounded that it has a melting point between 1400 and 1500 degrees Fahr. and can be raised to 1950 degrees Fahr. It is desirable to have the melting point of the salt far enough below the temperature at which it is actually used that its viscosity at the operating temperature will be low and the drag-out a minimum. The salt almost must be nonoxidizing, nonfuming and noncorrosive to both equipment and product.

Stainless iron of 16 per cent chromium content has proved satisfactory for the metal parts of the equipment. For handling the rod into and out of the bath, slings of 18-8 chrome-nickel steel are used.

Little Oxidation

Rods are introduced in quantities small enough that bath temperature will not be reduced appreciably. They are held in the bath until they have attained the temperature of the salt, removed promptly by a hoist which tilts the load at the same time it raises it, allowing the excess salt to drain off. The load is quenched immediately in an adjacent water tank. Due to the protective action exerted by the molten salt until the metal is immersed, little oxidation occurs and the metal is in proper condition for further cold working or for immediate aging at a lower temperature.

The exact treatment of the rod from this point on depends upon the composition of the alloy and the properties desired in the finished product. Mr. Croft declares the new process gives promise of effecting a uniform heat treatment and high quality.

Progress in Steelmaking

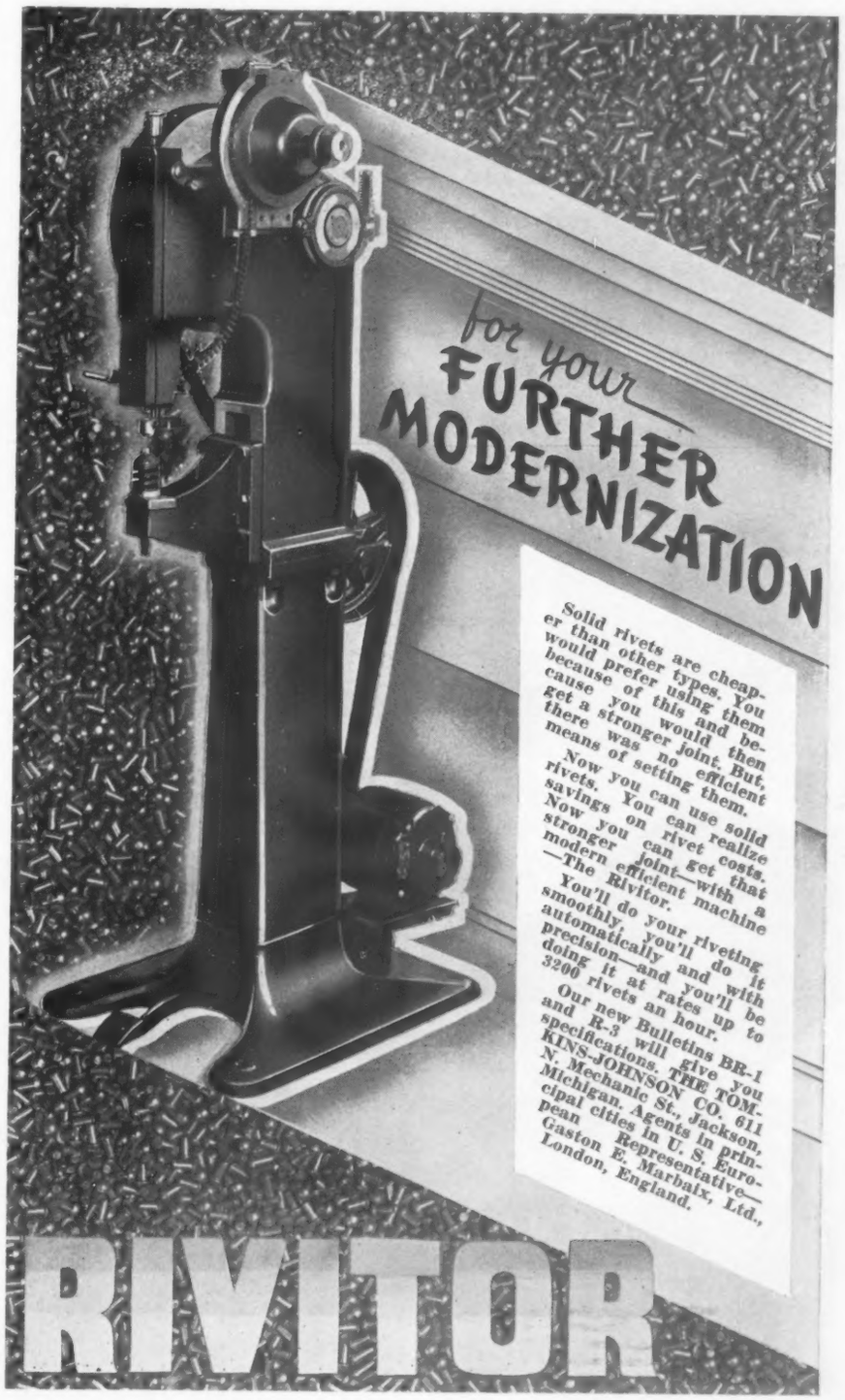
(*Concluded from Page* 258)

Mr. Boynton, is that developed by Carl Steinbacher; it has a lateral angle of 22½ degrees and permits improved operation, chiefly through ability to carry blast temperatures above 1600 degrees Fahr. and with uniform blast pressure and regular movement of stock.

Wet cleaning of blast furnace gas has been improved, says Mr. Boynton by using successive banks of spiral tile, the spirals within each bank being continuous. Two sets of sprays operate at 10 pounds pressure; total water is about 25 gallons per 1000 cubic feet of gas. Half of this is fed from the upper sprays and half from the lower. Dust content of gas to the washer is 8 to 10 grains per cubic foot which is consistently reduced to less than 0.15 grains. Washing by static means, says Mr. Boynton, has been carried still farther in a device known as the stationary disintegrator; elimination is as high as 33 gains per cubic foot of gas and after elimination the gas is nearly dry. Another development is a sequence for automatic control of blast furnace charging.

A principal trend, says G. B. Garrett, Arthur G. McKee & Co., Cleveland, was the tightening of specification limits on both pig iron for foundries and steel works. Wide introduction of strip mills to produce high class sheets has necessitated keeping certain elements to much lower minimums. "This has made it necessary for the blast furnace operator to maintain very close control over his product and do everything possible to insure regularity in furnace operations," says Mr. Garrett. "Therefore, closer scrutiny is being given to the preparation of raw materials entering into the blast furnace charge, and washing and mixing of coals, better screening and sizing of stone and better preparation and sizing of ore are receiving great attention.

"The beneficial results of sinter in the burden also are claiming wider attention. One rather interesting point is that as furnaces were


for your
FURTHER
MODERNIZATION
Solid rivets are cheaper than other types. You would prefer using them because of this and because you would then get a stronger joint. But, there was no efficient means of setting them.
Now you can use solid rivets. You can realize savings on rivet costs. Now you can get that stronger joint—with a modern efficient machine —The Rivitor.
You'll do your riveting smoothly, you'll do it automatically and with precision—and you'll be doing it at rates up to 3200 rivets an hour.
Our new Bulletins BR-1 and R-3 will give you specifications. THE TOMKINS-JOHNSON CO. 611 N. Mechanic St., Jackson, Michigan. Agents in principal cities in U. S. European Representative—Gaston E. Marbaix, Ltd., London, England.
RIVITOR

brought up to full capacity and the amount of wind blown increased accordingly, flue dust losses from many of the furnaces did not rise to as high a figure as under similar former operating conditions. Cause for this is still undetermined. Welded construction for gas and air mains and stoves has been adopted on recent installations and will be used on furnace shell and mantel on a new furnace now being built. Extensive use of insulation on stoves, hot blast and even cold blast mains and increasing use of small checker stoves and fine gas cleaning, principally electric precipitation, are noted. Many studies are being made for the more extensive use of clean blast furnace gas throughout the plant."

Co-operation of blast furnace and open hearth men in the study of the effects of combined carbon and temperature of hot metal, believes Ralph H. Sweetser, New York, will lead to a great improvement over present practice. "In line with the practice of crushing and sizing iron ores before charging into blast furnaces," says Mr. Sweetser, "there is a tendency toward a larger percentage of hard ores in the furnace burden, not only of sintered concentrates and fine ores, but of direct furnace ores consisting of cobbed magnetites. Movement of 3000 tons of magnetic iron ore from Port Henry, N. Y., to Cleveland, by water, as reported in STEEL of Nov. 29, 1937, is an indication of the trend towards the use of ores enriched and hardened by concentration and sintering, thus eliminating the moisture and much of the silicon. This move is decidedly toward elimination of freight on useless materials, just as in the case of clean coal for furnace coke."

Maximum width of hot strip mills, says L. A. Umansky, General Electric Co., Schenectady, N. Y., has been increased to 98 inches. Delivery speed has been stepped up to 2150 feet per minute. Total capacity of main drives on a single hot mill has reached a value of over 42,000 horsepower. Capacity of a single drive has been increased from 4500 to 5000 horsepower.

Direct Current Motors Used

"A radically new departure was made in 1937 in the method of driving the runout tables and coilers of wide strip mills," says Mr. Umansky. Instead of using squirrel cage motors and supplying them with adjustable frequency from direct to alternating current motor generators, the latest three mills will employ direct current, mill type motors, one motor per roller or per pair of rollers, furnished with power from one or more adjustable voltage generators. Appreciable power saving, smoother and simpler control and saving of substation space are advantages from the new method.

"Speed of cold rolling of strip has been stepped up in several instances to about 1750 feet per minute, with a 2000-foot minimum goal within sight. This requires greatly increased power and a still greater precision of control, particularly when accelerating or retarding the mill while rolling. Electrical tensiometers for indicating and controlling strip tension between stands are finding a wider use."

A very interesting and novel rod mill, arranged to finish simultaneously four strands of rods at a speed close to 4000 feet per minute, says Mr. Umansky, employs nine direct current motors in the drive and utilizes a very special type of control. Use of Ward-Leonard control for blooming and slabbing mill auxiliaries is spreading. Factory assembled control and switchgear apparatus definitely has become a standard for steel mill applications because of great saving in installation time.

In his comments, W. H. Burr, electrical superintendent, Lukens Steel Co., Coatesville, Pa., emphasizes progress in heating, processing,

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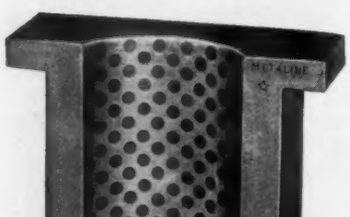

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shearing and handling of rolling mill products. "Blast furnace gas," says Mr. Burr, "has been used for heating soaking pits with results which compare favorably to those obtained with coke oven gas. Automatic control of heating or soaking pits and side furnaces is resulting in lower costs and a better rolled product. Refinements in metering and control equipment are permitting more economical use of fuel and more accurate records of operations and costs.

"Modern, improved picklers and high speed electrolytic cleaning lines, with means for removing dangerous fumes, are refinements which add to the already high quality and finish of product and are making for better working conditions in the mills. A new principle, utilized in the Soderberg shear, is giving gratifying results in shearing. Improvement in design of conveyors and tractors is simplifying the problem of handling materials. "Some new developments in the design of open-hearth furnaces have been patented and new methods of heating are being tried out," says Mr. Burr.

Advances in Flat Rolling

J. H. McElhinney, assistant vice president, Wheeling Steel Corp., Wheeling, W. Va., in referring to advances in flat rolling, points to increases in mill speeds which help as to tonnage and, in hot strip mills, allow production of lighter gages." Quality of flat rolled products has continued to improve as mill men learn more about the process and due also to development of equipment," says Mr. McElhinney. Equipment includes at least three classifications: First, more precise instruments for indicating and controlling what is going on during rolling; second, the rolling mill machinery itself; third, and notably, the electrical motors and control for driving the mills. There also has been some advance in equipment other than rolling proper, such as continuous pickling, strip welding to form larger coils, strip cleaning, and in lines to trim and shear."

A new rotary, mast type pickling machine makes it possible economically to pickle coiled strip from continuous mills of smaller capacity. Much headway was made during the year in the development of hard rolls which will not be marked by the product and which will not, in turn, mark the product.

An interesting feature of steel mill business has been the adoption of United States practices and developments in foreign countries, says T. E. Simpers, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. England, Australia, Japan and Russia, he says, have installed mills of American design.

Casting

(*Concluded from Page* 273)

slump force abandonment or postponement of undertakings in this direction.

Noticeable progress was made in the gray iron industry in connection with safety and hygiene, Mr. Rentschler reports. Safety campaigns received impetus and more states passed legislation dealing with occupational diseases, particularly silicosis.

Technically, he says, the gray iron industry continued progress of recent years. A more general knowledge of metallurgy and metallurgical requirements has enabled foundrymen to produce superior irons for general and specialized applications. Customers have made more discriminating demands, purchasing more castings to meet definite specifications and requirements of service. The gray iron industry was fully prepared to meet this demand. In closing, he asserts the industry can look back on 1937 with consciousness that it has maintained its position, and look forward to further progress in 1938.

Trend in the foundry industry in the past year, as summarized by

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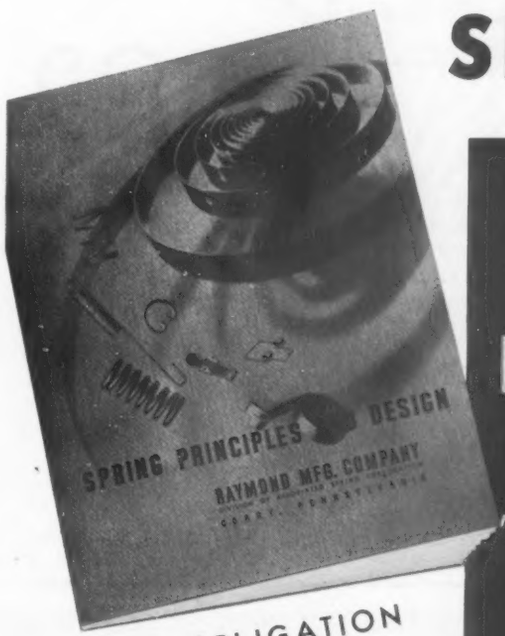

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R. S. MacPherran, chief chemist and metallurgist, Allis-Chalmers Mfg Co., Milwaukee, is toward still further mechanization and development along lines of maximum production. Alloy irons are becoming more widely used and the general tendency is toward higher grade castings. Development of X-ray and gamma-ray equipment will still further eliminate uncertainties in the use of castings.

There is every indication that the foundry industry is lining up to take advantage of important metallurgical developments of recent years, in the opinion of R. G. McElwee, foundry engineer, Vanadium Corp. of America, Detroit. Foundrymen and users of castings no longer are content to accept old standards of quality and ratios of scrap to good castings. Technical men are more in demand than ever to control routine operations and to assist in producing castings within specified limits.

Those who qualify themselves for the next step will be first to find their efforts rewarded by increased profits and a more loyal clientele, Mr. McElwee believes. The progressive foundryman must provide himself with a new type of sales department, one which can sell engineering properties rather than castings, one which can work hand-in-hand with designers of machines to the end that proper materials are specified and that the designing engineer may be kept conscious of advances in metallurgical practice.

A considerable number of new applications for malleable iron castings are cited by A. F. Jackson, vice president, Michigan Malleable Iron Co., Detroit, and president, Malleable Founders' society, in reviewing progress of the year in this field. Concerning melting practice, he mentions new installations for duplex melting with cupola and air furnace combinations and states that rotary melting furnaces and tilting-type holding furnaces are finding wider use.

Most pertinent in melting practice, he continues, is control of melting in the reverberatory or air-type installations. This practice is greatly improved and more effort is being made to get and hold chemical specifications. This is required particularly in cases where a rapid annealing cycle is used.

Annealing Capacity Increases

Much of the prejudice against rapid annealing of malleable iron castings has been overcome, Mr. Jackson states, and producers are making plans for wider adoption of the process. At present, four furnaces are operating on a 15-hour annealing cycle with a combined annual capacity of 35,000 tons and three are operating on a 32-hour cycle with a combined annual capacity of 32,000 tons. The coming year probably will see this capacity increased considerably.

Installation of shot blasting machines is gaining favor rapidly in the industry. Better cleaning and less dust are two important factors of this type of cleaning, according to Mr. Jackson.

Malleable iron metallurgy long has been overshadowed by rapid advances in steel manufacture and applications, but progress in recent years in malleable metallurgy has been rapid and malleable foundrymen have more than shared with the increase in knowledge obtained through constructive research, declares D. O. Thomas, general manager, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich. Management must regard research and development work as major department and continue to furnish necessary personnel to carry on. Technical control has improved the product to where it can be regarded as reliable as any steel product. Further technical knowledge will continue to show a substantial saving if properly carried out.

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our field in other engineering applications, in which pearlitic malleable has splendid possibilities, Mr. Thomas continues. In many cases, pearlitic malleable will lower costs of several automotive products materially. In some cases, reduction in weight is accomplished and in others machining and assembly costs are lowered.

To H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, an interesting development in malleable iron metallurgy is continued improvement in design of heat treating furnaces, largely of the radiant-tube type with a view to permitting atmospheric control and greater unformity of charge temperature even with fairly rapid heating and cooling rates. Insofar as these results have been attained and have been used by the industry, considerable improvements in annealing time have been made along perfectly orthodox metallurgical practice recently.

Silicon Content Increased

Development of iron of approximately the usual carbon content carrying a silicon content up to 1.5 per cent also is an achievement worthy of comment, Mr. Schwartz declares. Although no doubt something remains to be done in developing commercial practice in making these alloys, they have received much attention as being capable of rather quick graphitization. Heat treatment of malleable iron also is commented upon by Enrique Touceda, consulting engineer, Malleable Founders' society, Albany, N. Y., who points out an intensive study has been made of various types of continuous ovens with controlled atmosphere with a view of scale prevention, reduction in annealing costs and saving in time. This has resulted in a number of recent installations, with more in contemplation.

More attention is being paid to reclamation, conditioning and handling of foundry sands, even in smaller plants, he states, and many foundries now are making use of sand testing apparatus to advantage, in connection with control of heap sand and facings.

Agitation of insurance companies on the silicosis hazard has forced plants to make greater efforts toward elimination of dust, both in the foundry proper and particularly in annealing rooms, with the result that now less packing is used. This has been made possible, Mr. Touceda explains, through increased use of bottom pots, in which no packing is employed, in the case of either the pulverized coal-field car-type or periodic-type ovens, and in the case of continous ovens where trays are substituted for pots and no packing is required.

Sizing up the year's developments in the nonferrous castings field, N. K. B. Patch, secretary, Lumen Bearing Co., Buffalo, is impressed with increasing improvement in quality of castings, this resulting directly from the more intensive use of laboratory controls and higher quality materials. Producers of nonferrous ingots have improved quality and foundries making their own alloys are compounding them more intelligently.

Makers of nonferrous sand castings are devoting more attention to the matter of finish, Mr. Patch continues. A larger proportion of the castings are properly sandblasted. At the same time, the industry is giving more intensive care to producing castings which satisfactorily meet service requirements.

Likewise H. M. St. John, chief metallurgist, Detroit Lubricator Co., Detroit, regards progress in quality control and improvements as outstanding in the nonferrous casting field. American brass foundries, he says, have begun to practice methods of molding and sand control and thus far are pleased with results. Experimental developments,

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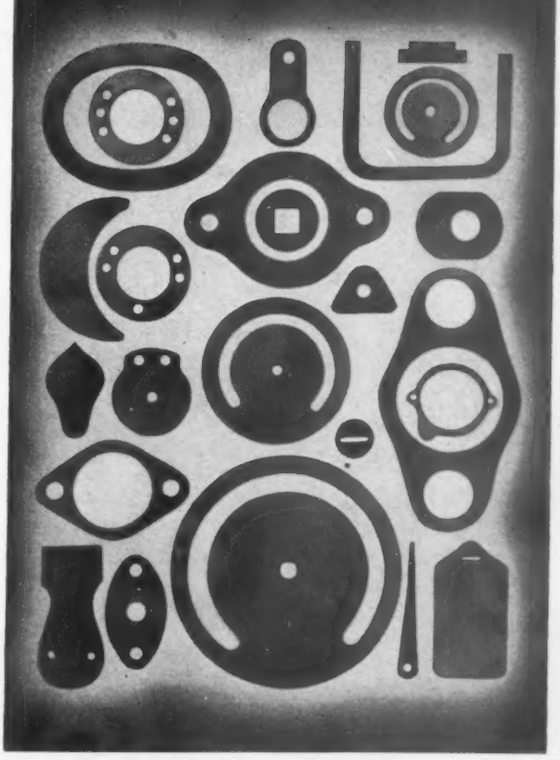

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not yet actually employed in this country, include use of portland cements in molding sand mixtures and use of molding compositions consisting largely of silicon carbide. Brass foundrymen are beginning to consider the utilization of the X-ray and spectriscope in their work.

Age hardening alloys are showing good progress, according to Mr. St. John. Investigations have been reported covering the influence of small proportions, singly or in combination, of berryllium, titanium, cobalt, chromium and zirconium in copper castings; titanium and cadmium in aluminuum alloy castings; and beryllium in magnesium castings. A typical result of one of these researches was an alloy containing 97 per cent copper, having a brinell hardness of 220 and an electrical conductivity 45 per cent that of pure copper. In other cases, a conductivity as high as 75 per cent or more has been attained, coupled with physical properties far superior to those of pure copper.

Presence and effect of gases in nonferrous alloys continues a subject of active discussion, Mr. St. John asserts. The cathode ray has been employed as an aid in analysis of gas content present in solid casting with rather striking results.

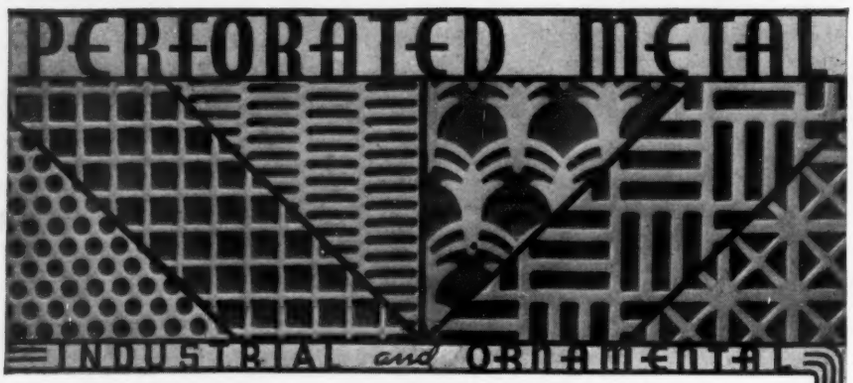
The 1937 drive for profits through lower costs and greater production has led to increasing mechanization of foundries and widening application of mold conveyor lines in small as well as large foundries. This is the statement of R. S. Hammond, vice president, Whiting Corp., Harvey, Ill., and president, Foundry Equipment Manufacturers' association. This work on conveyor lines has led to mechanical and preparation units, continuous core ovens, faster molding machines, continuous melting equipment, new annealing processes, and new machines for continuous cleaning of castings.

Demand for continuous metal has led to duplexing, particularly in the malleable industry where 25 per cent of production now is duplexed in various combinations of cupola, electric, rotary and air furnaces. In the gray iron field, continuous molding has demanded continuous cupola metal, large insulated reservoir ladles often arranged for desulphurizing, and improved equipment for handling, preparing and mechanical charging of melting stock at lower costs. In larger gray iron foundries, duplexing with hot blast cupolas and air furnaces of the tilting type is providing not only continuous metal but low-cost metal of greater uniformity of temperature and analysis.

Wet Blasting Effective

The past year saw increasing recognition of merits of the hot blast cupola for producing high-quality iron at low costs, Col. Hammond asserts. Efforts to improve working conditions brought marked changes in casting cleaning, dust prevention and collection. The new and effective wet blasting has led to a new process of sand washing, drying and reclamation that promises large savings in cost of sand, especially in steel foundries.

An outstanding and far-reaching development in smaller open-hearth steel plants, in which hot blast-furnace iron is not available, is application of modern foundry melting methods in preparation or hot metal charges. The same methods might be used in larger steel foundries using open-hearth furnaces. In this process, Col. Hammond explains, low-cost gray iron and steel scrap are melted in efficient hot blast cupolas; the metal then is desulphurized in large ladles and poured into a holding furnace where 35 to 60 per cent of the open-hearth charge is accumulated for charging hot into the open hearth. In a plant of three or four open hearths, this hot metal preparation might increase capacity equivalent to another open hearth at a fraction of the cost of such a furnace.



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Die Casting

(*Concluded from Page* 271)

Large castings, thin walled castings and accurate castings now can be produced from magnesium alloys as well as from zinc and aluminum base alloys.

"Field of application for zinc base die castings has been increased many fold by developments which permit production of larger castings and the reduction of wall thickness," says Mr. Pack. "The 1938 Cadillac grille, weighing more than 30 pounds and cast with more than 1300 square holes, is typical of what now can be produced in zinc base die castings.

"Satisfactory progress has been made in further development of the brass die casting process. During the past year many new applications for brass die castings were developed and substantial progress made in overcoming the natural handicaps inherent to the die casting of brass and other useful copper base alloys.

"Research work now under way assures continuance of progress in the further development of the die casting process and definite improvements in die casting of zinc, aluminum, magnesium and copper base alloys."

Since the development of 99.99 zinc there has been a steady trend toward zinc die castings; they now are absolutely permanent if properly controlled, says D. L. Colwell, Stewart Die Casting Corp., Chicago. Use of A. S. T. M. No. 23 alloy is increasing and the old No. 21 alloy gradually is being eliminated.

Mr. Stewart says: "Many die casting plants have modernized their equipment and high speed and high pressure machines are becoming the rule. In some instances older type machines still are being used, necessitating special alloys. In this connection No. 25 alloy containing only 1.25 copper often is used to overcome deficiencies in die design or machine design, despite the fact this alloy is particularly subject to tin and lead contamination and therefore is dangerous.

"So-called cold chamber machines are gaining, being used on aluminum and magnesium in certain cases, also on brass. These machines produce perfectly condensed castings. As recently improved they equal the old gooseneck machines in speed.

"Finishing of die castings has received close attention. Bright nickel plating is used more widely, eliminating part of the buffing operation. A new process for plating die castings with a brass plate, which matches gold, has acquired some prominence. Zinc base die castings now can be pre-treated to insure perfect adherence of enamels or other synthetic finishes, particularly when baked. It is hoped, however, that manufacturers of paints and lacquers will develop finishes to withstand greater wear."

New applications of zinc alloy die castings during 1937, says R. Davison, New Jersey Zinc Co., New York, demonstrate conclusively that the metal and method are now part of every designer's "kit of tools." Not only have new fields of application been developed but there has been a wider and more exacting use of such castings by manufacturers long familiar with them.

Mr. Davison says: "Certain classes of manufacturers, notably of office machinery, electrical appliances and coin operated equipment seem to be leading toward complete designs in zinc alloy. Such units as the Wurlitzer automatic phonograph, Ditto duplicator and Dakko photographic enlarger employ the material for practically every part, structural, functional and ornamental. These units contain, respectively, 71, 32 and 14 die cast parts. Included are gears, levers, rotating members, pressure cham-

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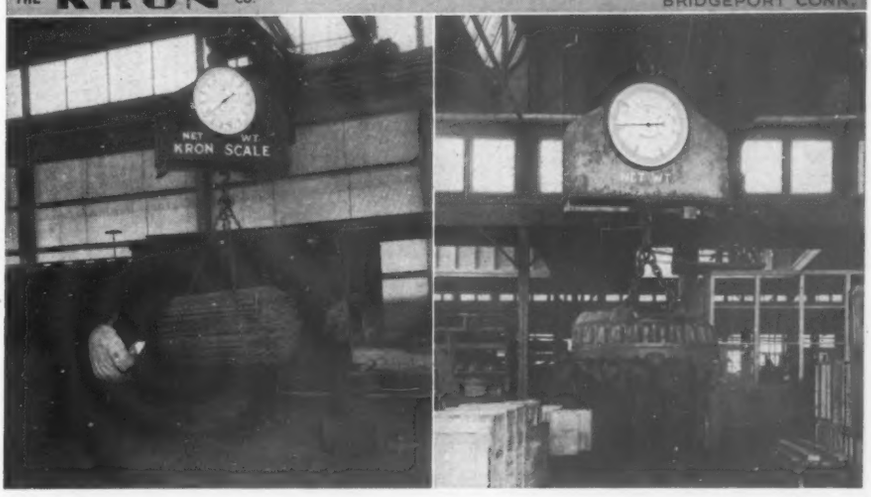

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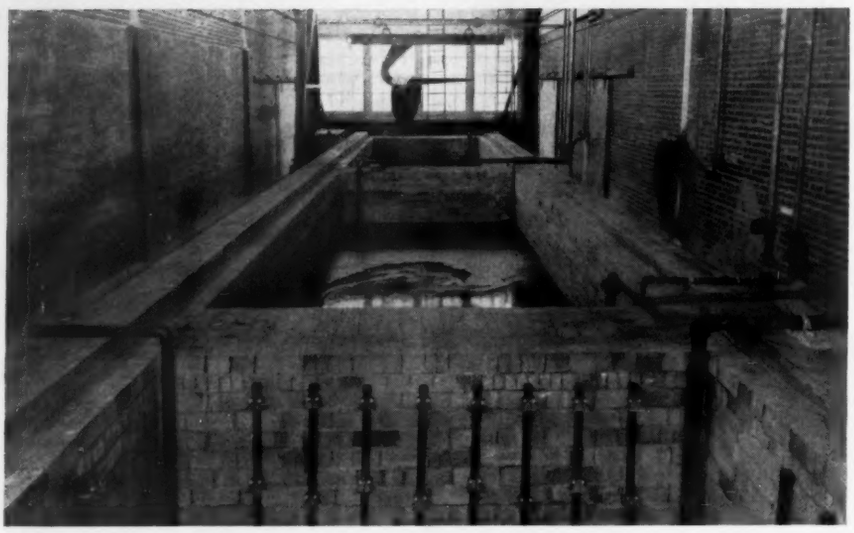

● Pictured above are two pickling tanks together with rinse tank, installed October 1936, in the new cleaning house of the wire mill of the Buffalo Bolt Co., N. Tonawanda, N. Y.

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"Automotive uses are still on the upswing with more zinc alloy die cast grilles than ever on 1938 models. Taking a cue from the home machine shop, light machine tools now are important consumers of massive, zinc alloy pieces. Lock and hardware industry is using more zinc alloy parts. Toy makers, in die cast items, are able to combine cost savings with greater realism. Watch guards, minute zipper teeth, pea-sized dogs and stops and extremely small items with dielectric and wire inserts now quite commonly are made as zinc alloy die castings."

More Magnesium Castings

Use of the die casting process as a method of producing Dowmetal magnesium alloy parts is becoming increasingly important, says Dr. John A. Gann, Dow Chemical Co., Midland, Mich. Because of its low specific gravity, this alloy is being used more extensively in movable parts and portable machinery. Recently developed high pressure machines result not only in smoother and sounder castings with increased strength but in lower production costs. Improvements in scrap recovery, molten metal protection and lower melting equipment maintenance also have helped to reduce prices on such castings to a level comparable to that on other light alloys. Castings of increased size now are being produced without sacrifice of accuracy or soundness. One part now in production is a conveyor casting 6 feet 2 inches long weighing but 2¼ pounds. More manufacturers are using magnesium alloy die cast rotors.

Gradual improvement in technique in producing and finishing die castings occurred in 1937, says Herbert Chase, consultant, Forest Hills, N. Y. Some new machines have been built but with few radical departures in their design. Zinc alloys, now well standardized, are used in tonnages approximating three times those for all other die casting alloys combined, largely because low in cost and possessed of high impact along with other properties. An outstanding development, he says, is a complete, zinc alloy, die cast, 1-piece, radiator grille weighing approximately 13 pounds and 2-piece grilles of about the same weight whereas many early grilles weighed almost twice this amount. There are more multiple-piece grilles than heretofore. Zinc alloy die castings also have gained headway in many other automotive applications. Such die castings also are used more extensively in electrical appliances, business and vending machines, instruments, hardware and the like.

More machine cleaning is being

done than ever before, says Mr. Chase, and attention is being paid to flexible layouts of machines which complete the casting and pack it ready for shipment, in some cases literally before it has cooled to room temperature. Practice in plating has improved, with a trend toward heavier coatings. Much bright nickel is being applied, with savings in buffing as well as all-over cost. Organic finishing has been improved and difficulties once encountered in peeling have been obviated, due to proper cleaning practice, chemical treatment and good practice in applying and baking.

Metal Finishing

(*Continued from Page* 270)

available in sheets in various patterns and in zinc base coil strip in crimped effects. Red, green, blue and yellow are the colors. With ordinary care, manufacturing operations are not likely to mar it. Scoring is furnished both in plain sheets and Metal-Bord, which consists of thin metal facing adhered to cardboard backing. Special Stripes consists of alternating bright and satin stripes in an unlimited variety of combinations.

An application of alternating bright and dull finishes is found in highway markers of aluminum, a development mentioned by R. T. Griebling, Aluminum Co. of America, Pittsburgh. During 1937 the Alumilite process was first used on automobile license plates. Use of the first continuous machine for coating of aluminum strip by the Alumilite process, Mr. Greibling considers an important 1937 development.

"Increased production of hot strip subsequently cleaned and treated for hot-dip galvanizing has presented a new problem," observes Wallace G. Imhoff, president, Wallace G. Imhoff Co., Vineland, N. J., and technical director of research, American Hot-Dip Galvanizers association, Pittsburgh. He refers to long hairline blisters elongated from air or gas pockets which appear in strip rolled continuously in one direction but which are not apparent in the hot rolled or pickled sheets. For remedying this he stresses the use of quality inhibitors of high concentration, free from impurities and diluents.

A way to profits is pointed by Mr. Imhoff: "On account of the high cost of materials and labor, a number of companies obtained benefits and economies by using a good, strong, undiluted inhibitor. Cost of the inhibitor is more than compensated for by the effective saving in acid and metal consumed per ton of metal cleaned."

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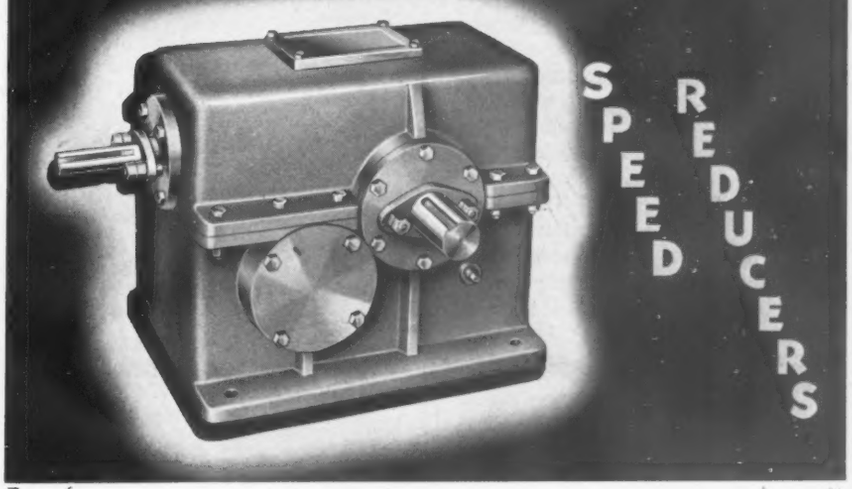

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made in solving the problems of removal of scale developed from coated welding rods. A soldering flux powder developed by American Solder & Flux Co., Philadelphia, for repairing hot-dip galvanized coatings is considered by Mr. Imhoff as important.

Developed by W. H. Spowers Jr., consulting engineer, New York, is a new galvanizing kettle, with inside lined with a special material upon which zinc has no action. Preventing deterioration of the side walls, it also prevents dross loss attributed to deterioration of the steel plates. Mr. Spowers also developed a blanketing material which, when placed on top of the kettle, prevents formation of oxides and retains in the kettle 35 to 50 per cent of the heat usually lost by radiation.

Discusses New Vehicles

Benjamin Joachim, president, Joachim Research Laboratories, Brooklyn, N. Y., refers to new oils such as Oiticica from Brazil and a synthetic similar to china wood oil but made from castor oil. In pigment vehicles, he says, a host of new synthetics makes possible new finishes for special uses and increased economy and durability. A late development in coating steel is Metalead, a fine metallic lead leaf made into a paste to permit proper dispersion; when mixed with the proper vehicle it produces an excellent anticorrosive coating. An innovation is the use of aluminum pastes and vermiculite mica in irridescent automobile finishes. Prepared pastes and chips such as lacquer pastes and Nitrocol, he says, are making possible economical application with improved results. Many new pigments have been introduced in the color field.

J. E. Hansen, Ferro Enamel Corp., Cleveland, says the porcelain enameling industry ended the year with some increase over the previous year's production. Installations of radiant tube furnaces have resulted in economies and more uniform operations. The past year saw the introduction of softer ground coats that mature at temperatures as low as 1520 degrees Fahr. Fine results obtained indicate they will be used generally during 1938. He says that use of highly opaque cover coat enamels has increased greatly during 1937, as with such enamels it is possible to get required coverage or opacity with one coat over the ground, with less tin oxide or substitute opacifiers added at the mill. As a result, he says, one complete enameling cycle is eliminated and the thinner enamel application increases the resistance to chipping due to mechanical shock.

Mr. Hansen mentions a recently

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developed stabilizing material used as a mill addition in enamel for recoat work; with the proper amount of this material in the recoat enamel it is possible to maintain a more uniform color and opacity between 1, 2 or 3-finish coat pieces. The same principle is applicable to normal 2-finish coat work equally as well.

The past year saw increased use of porcelain enameled sheet as an architectural medium, says Mr. Hansen. Too, a pronounced trend toward prefabrication is noted, with many more units being entirely fabricated before being delivered to the enameling plant, thus throwing definite problems onto the shoulders of porcelain enamelists.

Wilbur Henry Adams, industrial designer, Cleveland, emphasizes the importance of correct design. He considers porcelain enamel one of the finest of all finishes and believes it will be universally accepted as one of the important finishes for store fronts.

Making Rapid Finishes

H. Muehlbeck, Berry Bros. Inc., Detroit, alludes to manufacturers who install painting, conveying and baking equipment and establish a baking time in advance. It then is up to the paint manufacturer to supply a product to work with the equipment. In such cases it usually is a problem of producing paints that will bake faster and at higher temperatures, and this has been done. He further calls attention to the so-called original or novelty finishes which in the past included crystallizing lacquer and japan, crackle, spatter and wrinkle finish; the current popular finish is wrinkle. He points to Multiform finish, developed by his company against the day when wrinkle finishes are on the decline.

To the paint manufacturer, the aviation industry offers the most difficult problems, Mr. Muehlbeck contends, because of difficulty in securing adhesion to the special metals used as well as the rapid changes in temperature the finish must withstand; for this application his company has developed a new chromate primer coat.

"New amine resin materials are definite steps forward in the development of metal finishing," says Dr. William Krumbhaar, Beck, Koller & Co., Detroit. "One of the most important developments is a new and different type of synthetic resin that will give a tack-free, scratch-proof and mar-proof surface immediately upon removal from the baking oven. New heat hardening, polymerizing, amine resins, such as No. 3440 Beckamine, have overcome objectionable difficulties such as poor water and moisture resistance, poor adhesion and stability, and it is now possible to produce synthetic enamels for metal surfaces which have all the good properties of vitreous enamel without drawbacks such as brittleness."

Herbert G. Clopper, Newark Varnish Works, Newark, N. J., says: "Synthetics have occupied the center of the organic finishing stage

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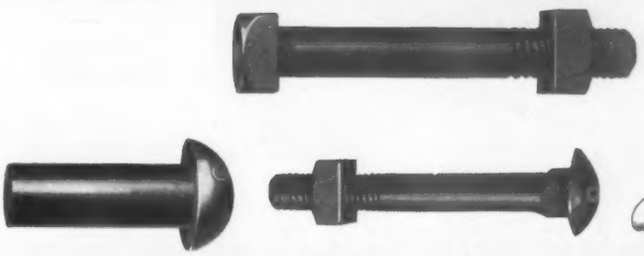

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during the past year and at this writing bid fair to continue to hold the limelight for the coming year. The organic finishing industry can be counted on to show still greater strides next year and in the future."

Billings-Chapin Co., Cleveland, developed a new product described by S. R. Kiehel, technical director, as a high-gloss, black, baking enamel which can be brushed, sprayed or dipped and is highly resistant to acid and alkali.

American Chemical Paint Co., Ambler, Pa., has set up two new methods of applying zinc phosphate coats to cleaned steel surfaces. One is the spray-Granodine process, used particularly in priming refrigeration cabinets. The other is an immersion process for priming cabinet panels. The company also has developed copper coating of round steel wire and, to an extent, strip steel.

An outstanding improvement in anticorrosive paints for steel and nonferrous alloys, says Robert J. Moore, Bakelite Corp., Bound Brook, N. J., has been made through new developments in raw materials for the paint and varnish industry. These make it possible to meet specifications demanding high water and alkali resistance in the vehicle together with flexibility and the presence of inhibiting pigments in the primers.

Of interest are some of the recent trends in industrial designing. Egmont Arens, New York, has been able to obtain numerous clever effects by the use of chromium finished, snap-on moldings. He also reports successful use of thin stainless steel strip bent around castings, as in the case of a nameplate, or to finish off neatly the line where two castings meet.

George Switzer, New York, cites a definite and established trend toward use of color; from the "horrible examples" of the earlier days the past 12 months have seen a wider range of colors of greater authenticity. "Amazing possibilities of the use of color on steel remain unused because nobody as yet seems to have discovered a satisfactory way of coloring steel itself and at the same time retaining the true texture of the metal," says Mr. Switzer.

Finish Is Economical

The great use of crinkle finish, he believes, is due to the fact it is economical to manufacture, covers slight imperfections, is well adapted to colored lacquer or metal trim and does not show scratches, marks of wear or dirt as polished surfaces do.

George W. Walker, Detroit, looks forward to development of "clean, easily-flowing, smoother surfaces, pleasing to touch, yet psychologically warm and devoid of objectionable glare."

"Where cost is a paramount consideration," he adds, "steel is an especially fine medium for use by designers both as base and finish, and with wrinkle finish lacquer lends itself admirably to numerous products such as heaters, sweepers, vending machines and others." He cites color as an important factor, along with texture and durability, and also looks to the perfection of color treated stainless steel.

Alfons Bach, Cleveland, while disappointed in the satin chromium finish on metal furniture, also looks forward to the perfection of colored chromium plating and colored stainless steel, believing these developments will open great possibilities for the home furnishing field.

Heat Treating Illustrated

An interesting booklet, dealing with the completeness of surface combustion equipment for heating and heat treatment of metals was recently published by the Surface Combustion Corp., Toledo, O. The booklet entitled "Heating and Heat Treatment of Metals" is pictorial as well as explanatory.

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Manager

Steelworks Expansion

(*Continued from Page 280*)

Underway

Lorain Works: Relining and improving blast furnace No. 1. Improving charging and handling facilities at open-hearth plant.

National Works: Cold sizing mill and heat treating furnace for No. 1 seamless mill. New special finishing equipment for shrinkweld and shrinkgrit drill pipe and other special joints.

Ellwood Works: Changes and improvement at No. 5 mill for production of 50-foot finished tubes.

AMERICAN STEEL & WIRE CO.

Completed

Chicago District: Two additional rod mills and improved wiremaking facilities.

Various Works: Improving hot galvanizing equipment for round wires at 12 works.

Underway

Cuyahoga Works: Extension and improvement of facilities for making cold strip.

Cuyahoga and Donora Wire Works: Additional heat treating equipment.

Worcester, Electrical Cable Works: Additional facilities for making asbestos insulated wires and cables.

TENNESSEE COAL, IRON & RAILROAD CO.

Completed

Ensley Works: Addition to blast furnace No. 3, including relining.

Fairfield Wire Works: Improving wire drawing and finishing equipment.

Fairfield Steel Works: Relining and improving No. 6 blast furnace.

Fairfield Sheet Works: Two additional 3-high breakdown mills and general improvements.

Underway

Birmingham District: Cold reduction department including two 5-stand tandem 4-high cold reduction mills with auxiliary facilities, 48-inch hot strip mill, 45-inch blooming mill, 146 by-product coke ovens replacing two obsolete batteries.

COLUMBIA STEEL CO.

Completed

Torrance Works: New ingot furnace, auxiliary facilities, additions to roll shop. Mechanizing hot mills and improving normalizing, pickling and cold rolling facilities.

Ironton Works: Relining blast furnace and renewing furnace shell, piping, furnace stoves, hot blast mains and other auxiliary equipment.

Underway

Torrance Works: New 24-inch edging mill, scale breaker, additions to 36 and 22-inch mills, including handling and reheating equipment.

REPUBLIC STEEL CORP.

Completed

Youngstown: Increased capacity of 10-inch skelp mill by enlarging heating furnace and adding finishing capacity. Increased bar straightening and finishing capacities of 14 and 16-inch mill.

Warren: No. 1 hot strip mill widened to 42-inches and capacity increased. New 4-high cold mill and additional annealing capacity to increase production of silicon strip. Additional processing equipment for Enduro strip.

Central Alloy: Additional equipment to increase production of Enduro sheets.

Cleveland: 98-inch hot and cold strip mills. Blooming mill enlarged from 40 to 44-inch unit for rolling slabs up to 48-inch wide. Rebuilt and enlarged No. 4 blast furnace to 1000 tons capacity.

Berger: Purchased additional building and installed necessary equipment to manufacture all building products.

Union Drawn: Increased finishing and annealing capacity for cold drawn products.

Steel & Tubes: Enlarged building and installed additional welding equipment and annealing furnace.

Truscon: Improved methods and capacity for manufacturing various types of steel windows.

Underway

Youngstown: Enlarging No. 3 blast furnace from 500 to 825 tons capacity.

Buffalo: No. 2 blast furnace being enlarged from 700 to 850 tons capacity.

Gulfsteel: Two open-hearth furnaces and additional auxiliary equipment. Extensive changes and additions to sheet mill which will increase capacity approximately 50 per cent.

YOUNGSTOWN SHEET & TUBE CO.

Completed

Brier Hill Works: Press for baling light scrap.

Campbell: Installed ball insert in checkers on two blast furnace stoves. Two 15-ton cranes in hot strip mill. One tandem and two skin-pass mills, shear lines. Pickle line and building at cold strip mill as well as five batteries of annealing furnaces. In the seamless department, additional threading and cutting-off machines and an upset machine for handling up to 10¾ inch pipe. Additional milling, boring and tapping machines and a centralized hydraulic system. New building for No. 1 blacksmith shop, additional coal pulverizer for No. 5 boiler house, new sanitary equipment in coupling and blast furnace department.

Struthers Works: Additional cold straightening capacity, centralized drinking water system, swaging machine and furnace for making mechanical tubing.

Indiana Harbor Works: Track changes and additions made at blast furnace stockyard and charging floor. One soaking pit. Over and under-firing applied on No. 2 billet furnace. Three coil annealing furnaces to serve 10-inch mill. Additional pickling, liming and oiling facilities. Extension for coal storage at coke plant. New crane in 18-inch merchant mill. Special tooling for casing manufacture, recut saw and exhaust system for galvanizing department installed at tube mill. Two duplex shears, assorting room extension and equipment, three additional tin pots and an extension to the box storage building made at the tin

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mill. General improvements include new walls and sash for power house, metallurgical testing machine, water filters and new steam lines.

South Chicago Works: Pig machine modernized to make small size pigs.

Evanston Works: Automatic screw machine with tooling and new union forging machine.

Youngstown Metal Products Co.: Additional press capacity and two production welders and conveyor equipment.

BETHLEHEM STEEL CO.

Completed

Steelton Plant: Press and other equipment for manufacture of railroad freight train cars and frames.

Maryland Plant: One 65-inch continuous hot stripsheet mill, one 4-high, 5-stand tandem cold reducing mill for tin plate, one continuous rod and bar mill and wire drawing and finishing facilities, three heating furnaces at plate mill, two rows of soaking pits, and 150 standard-gage railroad cars.

Lackawanna Plant: Six soaking pits, additional sheet finishing facilities, and 225 standard-gage cars.

Cambria Plant: Additional finishing facilities at rod and wire department, one 4-hole soaking pit.

Los Angeles Plant: Warehouse for steel products.

Underway

Lebanon Plant: Extensions to forging department for increasing production of sucker rods and special bars.

Lackawanna Plant: Galvanizing department for sheet mills.

Cambria Plant: Enlargement of axle department, additional facilities for rolled steel wheel department.

WEIRTON STEEL CO.

Completed

Weirton Plant: No. 2 blast furnace relined and enlarged, No. 1 blast furnace stove rebuilt. One row of soaking pits. Equipment for increasing output of 48-inch hot strip mill and cold reduced tin plate including descaling system, cold mill drive, power facilities, annealing equipment and additional warehouse and shipping facilities.

Steubenville Plant: Four 500-horsepower boilers; one cleaning, trimming and cutting line for cold rolled strip. Four portable annealing covers, seven cold mills, one 4-arm pickling unit, eight tinning stacks. Extension to annealing building and warehouse. New scruff furnace and building. Installed flood wall, made sewer and track changes for flood protection.

GREAT LAKES STEEL CORP.

Completed

Great Lakes Plant: One 93-inch 4-high cold mill, flying shear unit, one continuous pickling line with welder, extension to annealing building, one 4-hole box annealing furnace and eight radiant tube box annealing furnaces.

Hanna Furnace Division: Three blast furnace gas-fired boilers, two 60,000 and one 75,000 cubic feet per minute turboblower.

Underway

Great Lakes Plant: One blooming mill, four 150-ton open-hearths, four waste-heat boilers, two ladle cranes, two charging machines, mold yard and stripper building, and extension to cold mill shipping building.

Hanna Furnace Division: One 1000-ton blast furnace complete with stock bins, ore storage, trestle, one turboblower, electric precipitating gas cleaning equipment, 130 by-products coke ovens and by-products plant, 42-inch gas main and two blast furnace or coke breeze fired boilers.

Michigan Steel Division: Fourteen radiant tube annealing furnaces.

AMERICAN ROLLING MILL CO.

Underway

Middletown Plant: One 4-hole soaking pit. Blooming mill will be motorized.

Hamilton Plant: Fifteen by-product coke ovens.

MISCELLANEOUS COMPLETED

Rustless Iron & Steel Corp.: Three-ton electric furnaces, 12-inch 3-high 7-stand merchant bar mill, one draw bench, power substation and distributing system. Outside storage and handling facilities. Grinding, annealing, pickling, and straightening facilities; lockers and

Summary of Construction

	Completed in 1937	Building in 1937
By-Product ovens	352	387
Blast furnaces	2	3
Bessemer converters	1	2
Open-hearth furnaces	1	7
Rolling Mills:		
Billet	1	0
Blooming	3	3
Buttweld pipe	0	1
Edging	1	1
Merchant bar	2	3
Piercing	0	2
Rod	3	0
Sheet, 3-high hot	8	0
Slabbing	0	1
Strip, 2-high cold	4	7
Strip, 3-high cold	1	0
Strip, 4-high hot	3	4
Strip, 4-high cold	17	13
Tin, 2-high cold	7	0
Tin, 4-high cold	5	0
Total	55	35

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storeroom; roadways, retaining walls, grading; laboratory, heating and other miscellaneous improvements.

Wheeling Steel Corp.: Pipe warehouse and finishing buildings at Benwood plant.

Acme Steel Co.: Miscellaneous buildings and equipment.

Timken Steel & Tube Co.: Additional building for cold finishing department.

Roebling's Sons Co., John A.: Installed 3-high ring-type cold strip mill at Upper Works, Trenton, N. J.

Allegheny Steel Co.: Installed arc-type electric furnace with daily capacity of 75 gross tons.

Central Iron & Steel Co.: New steel building and overhead traveling crane for flanging department; hydraulic pressure system and new 150-ton flanging press now being installed in this building. One 50-ton locomotive, one planer and one 150-horsepower waste-heat boiler.

Northwestern Barb Wire Co.: Two electric furnaces rebuilt changing daily rated capacity from 150 tons each to 300 tons each. Two bessemer converters and one cupola being installed in addition to a 5-stand 12-inch merchant mill.

Woodward Iron Co.: No. 2 blast furnace equipped with new offtakes. Thirty-eight by-product coke ovens rebuilt.

Atlantic Steel Co.: Two 5-block continuous wire drawing machines and six small 5-block continuous wire drawing machines installed.

Firth-Sterling Steel Co.: Completed new sintered carbide and carbide tool-making plant.

Michigan Seamless Tube Co.: New side tracks, steel storage yard with overhead crane, mill building, various draw benches, reeler and continuous annealing furnace.

Heller Brothers Co.: One 7500-pound steam hammer installed in forging shop.

Simonds Saw & Steel Co.: Two 650-pound and one 2000-pound Ajax furnaces for producing castings were installed. One 1500-pound electric furnace was disposed of.

Texas Steel Co.: Extensions to foundry building now being made.

New Ink Produced For Recording Charts

■ After more than six months of laboratory research, Permochart Co., Koppers building, Pittsburgh, announces the development of a new ink to be used on recording charts. Tests of the ink have proven successful, it is claimed.

Advantages claimed by the new charting ink include easy flow without flooding, no caking even if pens run dry and are left so for several days; and quick drying without smudging or spreading. Records of fifty hours duration are reported to have been made from one filling of the pen.

The ink is available in three colors; red, purple and green. It can also be obtained in 2 or 3 ounce bottles. Damage from pen penetration is entirely eliminated, it is said.

Construction and Enterprise

Ohio

WRIGHT FIELD, DAYTON, O.—War department, air corps, will receive bids to Jan. 10 for five pedestal-type riveting machines, delivery f.o.b. contractor's plant; until Jan. 14 for 108,000 feet balloon and extra-flexible cable. Bids based on f.o.b. contractor's plant.

SPRINGFIELD, O.—Ohio Edison Co. is arranging fund amounting to $4,830,000 for expansion and improvements during 1938, including extensions and replacements in generating stations, transmission and distributing lines, power substations, switching stations and other structures. Part of appropriation to be used for extending rural electric system.

Illinois

CHICAGO—Chicago Beef & Veal Co., 3443 Emerald avenue, will erect two-story packing plant addition. Plans by H. C. Christiansen, 59, East Van Buren street.

CHICAGO — International Harvester Co., 606 South Michigan avenue, plans installing heavy-duty and other motors and controls, switchgear, electric hoists, conveyors, and other equipment in one-story addition to plant on West Thirty-first boulevard for tractor production.

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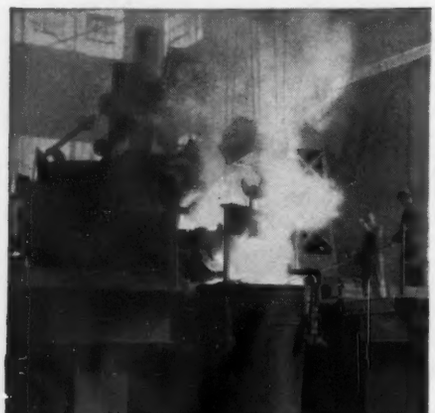
Project to be completed next May. Cost $1,000,000. (Noted Dec. 6).

CHICAGO—Continental Can Co., 100 East Forty-second street, New York, plans installation of motors and controls, conveyors, electric hoists and other equipment in new one-story machine and mechanical shop at South Ashland avenue and Thirty-seventh street, Chicago, where property has been acquired and will be modernized and equipped. Work begins at early date. Cost $100,000.

VIRDEN, ILL.—City council, G. Scott, clerk, city hall, will receive bids to Jan. 17 for constructing sewage treatment plant, pumping station, force mains, four 100-gallon-per-minute pumps, two 250-gallon-per-minute pumps. Cost $44,713. Wood, Walraven & Tilly, 222½ South Sixth street, Springfield, engineers.

BASIC ELECTRIC STEEL

FORGINGS



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Die Blocks & Piston Rods

NATIONAL FORGE AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNA.

Pennsylvania

ALLENPORT, PA.—West Penn Power Co., Pittsburgh, will proceed with extension of transmission lines and facilities at Allenport and vicinity for power service to mills of Pittsburgh Steel Co. Permission recently secured. Includes 10 miles transmission and distributing lines, installing new 6000-kilowatt automatic power substation at steel mill site, and enlargement of power substation at Charleroi, Pa., where additional equipment will be installed.

GROVE CITY, PA.—Borough plans water system improvements including new impounding well and two deep-well pumps. Maturity 1938. W. D. Brackenridge, borough manager.

PHILADELPHIA—Bureau of yards and docks, navy department, Washington, receives bids for motor-driven air compressors with capacity of 5000 cubic feet of air per minute for Philadelphia navy yard. Specifications 8633.

PITTSBURGH—Kelsey Hayes Wheel Co., Detroit, is taking bids on revised plans and specifications for one-story manufacturing plant to be constructed on Neville island in Pittsburgh, including machinery and installing equipment. Cost including equipment $1,000,000.

Connecticut

NEW BRITAIN, CONN.—Cremo Brewing Co., Belden street, plans installing electric power equipment in new one and multi-story additions to plant. Work to begin early in 1938. Cost $125,000. Edward E. Kawiak, engineer.

NEW HAVEN, CONN.—City takes bids in February for sewage disposal plant to handle sewage for western section of city. C. B. Gascoigne & Associates, Woolworth building, New York, engineers.

Massachusetts

PEABODY, MASS.—City has plans maturing for extensions and improvements to municipal electric power plant including installing additional equipment. Cost $50,000. Arthur L. Nelson Engineers, 31 St. James avenue, Boston, consulting engineers.

New York

WATKINS GLEN, N. Y.—New York State Electric & Gas Corp. has filed a petition with public service commission of New York, Albany, for permission to construct electric plants in towns of Veterans, Horseheads, Baldwin and Chemung, and in villages of Odessa, Burdett and Lodi. Maturity 1938. Cost $100,000. (Noted Nov. 1, 1937).

New Jersey

BURLINGTON, N. J.—Public Service Electric & Gas Co., 80 Park place, Newark, will construct addition to steam electric power plant to house 100,000-kilowatt turbine and two boilers. General contract given to United Engineers & Constructors, 1401 Arch street, Philadelphia, without competition. Equipment will be purchased by contractors. Cost $10,000,000. Maturity 1938.

Indiana

WINCHESTER, IND.—Standard Glass Co., Anderson, Ind., plans addition to plant at Winchester, necessitated by consolidation of plant. Cost including equipment $40,000.

Alabama

FLORENCE, ALA.—Julien H. Case, Route 2, applied to war department for permission to erect 6900-volt aerial transmission line crossing Tennessee river at lower end of Seven Mile island, Lauderdale-Colbert counties. Plans at U. S. Engineering office, 306 U. S. Courthouse, Nashville, Tenn.

Maryland

HAGERSTOWN, MD.—City, Joseph I. Lyon, city engineer, rejected bids for proposed central equipment building, and receives new bids Jan. 6.

POPES CREEK—Southern Maryland Tri-county Co-operative association, Wendell M. Holmes, president, Welcome, Md., will have hearing Jan. 3 before public service commission, Baltimore, for approval of an additional $50,000 loan to build electric generating plant at Popes Creek, Charles county. FEA has approved loan. Proposed generating unit will have capacity of 295 kilowatts. Esti-

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mated cost $49,000 not including price of site.

Missouri

CHILLICOTHE, MO.—City has plans maturing for extensions and improvements in municipal electric power plant, including installing new turbo-generator unit and accessories, boilers and other equipment. Will ask for bids soon. Henrici-Lowry Engineering Co., West Tenth street building, Kansas City, Mo., consulting engineer.

MT. VERNON, MO.—Lawrence County Electric Co-operative Inc., Mt. Vernon, has plans under way for primary and secondary lines for rural electrification system in parts of Lawrence and neighboring counties, including 150 miles of lines, outdoor power substations, and service facilities. Financing through federal aid. Cost $150,000. Bids will be called soon. Sverdrup & Parcel, Railway Exchange building, St. Louis, consulting engineers.

Arkansas

FAYETTEVILLE, ARK.—L. E. Maupin is interested in constructing 250-mile rural electric line in Washington county. $100,000 available.

Oklahoma

BARTLESVILLE, OKLA.—City will hold election Jan. 18 to vote bonds for purchasing, enlarging and rebuilding privately owned water plant. Cost $643,000. Ross Taylor, Bartlesville, engineer.

PONCA CITY, OKLA.—Continental Oil Co., Ponca City, plans increasing the capacity of its refinery at Denver, Colo. from 2000 barrels to 4000 barrels. Estimated cost $75,000.

TULSA, OKLA.—Amerada Oil Co., Tulsa, plans constructing natural gasoline plant at Langston, Okla. Estimated cost $50,000.

Wisconsin

MILWAUKEE—Ellsworth Pipe & Supply Co., plumbing and heating supplies, has purchased factory buildings at North Seventeenth street and West St. Paul avenue and plans building machine and fabricating shop, office, and additional warehouse and pipe storage sheds.

RACINE, WIS.—County board has approved additions to and remodeling highway department headquarters at Gatliff. Cost with equipment $40,000. Harry Bassinger, county clerk.

Texas

BRENHAM, TEX.—City has plans maturing for new municipal electric power station, including installing three diesel engine generator units and auxiliary equipment. Electric distribution system and street lighting system also to be installed. Work begins soon. Total cost of project $310,000. Garrett Engineering Co., Houston, Tex., consulting engineer.

LA BLANCA, TEX.—Refugio Refining Co., Edinburg, plans to construct a casinghead gasoline plant at its refinery at La Blanca. Estimated cost $125,000.

LUFKIN, TEX.—George H. Hutchins, Longview, plans to construct wood creosoting plant at Lufkin, to have annual capacity of 26,000,000 board feet, including installing new machinery.

SAN ANTONIO, TEX.—J. D. Bates, operator of Arkansas Vinegar Co., 611 Commerce street, Shreveport, La., and J. L. Burgie, operator of Burgie Vinegar Co., 927 Kentucky avenue, Memphis, Tenn., will establish vinegar plant and pump water from San Antonio river. Equipment to be installed in building near Blue Star street. Cost $80,000.

Iowa

IOWA CITY, IOWA—Board of education plans central heating plant in multi-story high school. Financing through federal aid. Work starts in January, 1938. Cost $700,000.

Pacific Coast

FRESNO, CALIF.—S. E. Hickman, purchasing manager, San Joaquin Light & Power Co., is taking bids on constructing substation at Fresno and Mariposa streets. Cost over $40,000. Engineering department of owners, engineer.

SAN FRANCISCO—Owens-Illinois Pacific Coast Co., 1855 Folsom street, San Francisco, subsidiary of Owens-Illinois Glass Co., Toledo, O., plans installing motors and controls, regulators, conveyors and other equipment in proposed new bottle and container plant, vicinity of San Francisco. Cost $100,000.

BONNEVILLE, OREG.—Pennsylvania Salt Mfg. Co., Widener building, Philadelphia, plans installing motors, and controls, regulators, electric hoists, loaders and other equipment in new plant, vicinity of Bonneville, where large tract has been acquired for construction of plant to manufacture sodium chlorate and allied chemical specialties. Power will come from Bonneville dam, power substation to be erected at new plant. Cost of entire project $600,000.

SPOKANE—Imperial Oil Co., Spokane, plans enlarging its refinery. Cost $350,000.

SPOKANE—Shell Oil Co., Shell build-

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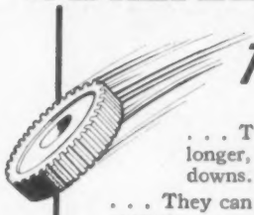

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NEW YORK — CHICAGO — PHILADELPHIA — DETROIT — CLEVELAND

ing, San Francisco, has plans under way for new boiler plant at bulk oil terminal on North Greene street. Work begins early in 1938. Cost with equipment $50,000.

Canada

VANCOUVER, B. C.—Andreas Stihl, Berlin, Germany, has purchased a site here on which he plans erecting a saw-manufacturing plant.

ST. JOHNS, N. B.—J. D. Gary, chief engineer, New Brunswick Power Co. Ltd., will receive bids at an early date for supplying a new turbine for Dock street power plant.

GANDER LAKE, N. F.—Bowater & Lloyd Co., 121 Queen Victoria street, London, E. C. 4, England, contemplates constructing sulphate pulp mill at Gander Lake. Estimated cost $6,000,000.

ARNPRIOR, ONT.—Ontario Hydroelectric power commission, 130 University avenue, Toronto, is taking bids early in 1938 for constructing dam and powerhouse at High falls on Madawaska river, 20 miles upstream from here, own forces. Includes general equipment, generator consisting of two units totalling 36,000 horsepower.

FT. WILLIAM, ONT.—Western Pulp & Paper Co., 372 Bay street, Toronto, plans constructing pulp and paper mill at Ft. William. Estimated cost $5,000,000. Goggin & Ripley Inc., 350 Madison avenue, New York, engineer.

KENORA, ONT.—English River Pulp Co. Ltd., 372 Bay street, Toronto, plans constructing pulp mill at Kenora, including 35 miles of railway. Goggin & Ripley Inc., 350 Madison avenue, New York, engineer. Estimated cost $2,000,000.

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